| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | IFHE 241 | Advanced Combinatorics | MATH328 | B. Sc. Mathematics | FST (IcfaiTech) | • Use of Group Theory for Counting Problems<br>• Coset techniques for representatives<br>• Polya theory of Enumeration | • Apply Group Theory to advanced enumeration problems. | 5% | 25% | 10% | 60% | 100.00% |
| 2 | IFHE 241 | Advanced ProbabilityTheory | MATH326 | B. Sc. Mathematics | FST (IcfaiTech) | • Basic Lebesgue-Stieltjes measures<br>• Integration and Differentiation theory<br>• Probability models and Kolmogorov consistency<br>• Independence, Borel-Cantelli Lemma<br>• Weak and Strong Laws of Large Numbers | Approach Stochastic Processes from a mathematical background. Likewise advanced Branching Processes. | 10% | 30% | 10% | 50% | 100.00% |

FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

S.V Jayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | IFHE 241 | Algebra | MATH312 | B. Sc. Mathematics | FST (IcfaiTech) | This course aims to provide a first approach to the subject of algebra, which is one of the basic pillars of modern mathematics. The focus of the course will be the study of fundamental concepts of algebra which include groups, subgroups, permutations, cosets and the theorem of Lagrange, homomorphism, isomorphism, rings, fields, integral domains and relate these concepts to the number systems, calculus and linear algebra.to study the division algorithm, factor theorem, remainder theorem and unique factorization theorem as they apply to polynomials over a field. Abstract algebra gives a good mathematical maturity and enables to build mathematical thinking and skill. | • Understand the concepts of groups, group homomorphism and isomorphism and related notions.<br>• Be familiar with common examples of groups of both finite and infinite order.<br>• Be able to construct and work with related objects: subgroups, Cartesian products, quotient groups.<br>• Understand what it means for a group to act on a set.<br>• Use the axioms that define a ring, and know the basic properties of rings arising from these axioms<br>• Know how to add and multiply polynomials over arbitrary fields, and be able to use this to define polynomial rings.<br>• Be familiar with various methods of proof, including direct proof, constructive proof, proof by contradiction, induction.<br>• Develop skills in creative and critical thinking, problem solving, logical writing and clear communication of mathematical ideas. | 10% | 35% | 15% | 40% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | IFHE 241 | Chemistry | BMCHEM 111 | B. Sc. Mathematics | FST (IcfaiTech) | · To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 15.0% | 25.0% | 15.0% | 45.0% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | IFHE 241 | Combinatorial Mathematics | MATH314 | B. Sc. Mathematics | FST (IcfaiTech) | • To acquire standard principles and functions for counting problems<br>• To use the fundamental facts on Set Partitions and Inclusion-Exclusion<br>• To familiarize the machinery of Generating Functions<br>• To develop ways of solving Recurrence Relations<br>• To initiate the study of Integer Partitions | • To formulate and solve basic combinatorial problems<br><br>• To apply techniques like Formal Power Series and Generating Functions when the problems require more than common sense<br><br>• To appreciate the scope of Combinatorial Theory involving other parts of mathematics like Number Theory. | 5% | 30% | 5% | 60% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | IFHE 241 | Complex Variables | BMMATH215 | B. Sc. Mathematics | FST (IcfaiTech) | This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications. | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 10.0% | 25.0% | 10.0% | 55.0% | 100.00% |
| 7 | IFHE 241 | Computer Programming I | BMTA116 | B. Sc. Mathematics | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures -- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the importance of cloud computing and its applications. | 15.00% | 40.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | IFHE 241 | Computer Programming II | BMTA127 | B. Sc. Mathematics | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 15.00% | 40.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | IFHE 241 | Continuum Mechanics | MATH327 | B. Sc. Mathematics | FST (IcfaiTech) | Be able to describe motion, deformation and forces in a continuum; Be able to derive equations of motion and conservation laws for a continuum ; Understand constitutive models for fluids and viscoelastic solids; Be able to solve simple boundary value problems for fluids and solids. | • Use tensor algebra and calculus for calculations and derivations in general (curvilinear) coordinates.<br>• Derive the governing equations of continuum mechanics from Lagrangian and Eulerian viewpoints using the divergence and Reynolds transport theorems and use the same principles to extend the derivations to previously unseen situations.<br>• Determine whether particular vectors, tensors and derivatives are objective and explain the concept of objectivity.<br>• Use the Clausis-Duhem inequality to derive thermodynamically consistent constitutive laws and determine any implied constraints.<br>• Use the general theory to formulate and solve problems in linear and nonlinear elasticity and compressible and incompressible fluid mechanics.<br>• Solve idealised problems in continuum mechanics analytically in spherical, cylindrical and Cartesian coordinates.<br>• Be able to convert the physical description of a problem in continuum mechanics into the appropriate governing equations and boundary conditions and, conversely, provide a physical | 10% | 25% | 15% | 50% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | IFHE 241 | Control Systems | BMAO312 | B. Sc. Mathematics | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 15% | 35% | 10% | 40% | 100.00% |
| 11 | IFHE 241 | Cryptography | MATH315 | B. Sc. Mathematics | FST (IcfaiTech) | • To understand the fundamentals of Cryptography<br>• To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.<br>• To understand the various key distribution and management schemes.<br>• To understand how to deploy encryption techniques to secure data in transit across data networks<br>• To design security applications in the field of Information technology | • Analyze the vulnerabilities in any computing system and hence be able to design a security solution.<br>• Identify the security issues in the network and resolve it.<br>• Evaluate security mechanisms using rigorous approaches, including theoretical | 10% | 30% | 15% | 45% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | IFHE 241 | Differential Equations & Fourier Series | BMMATH216 | B. Sc. Mathematics | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 10.00% | 20.00% | 20.00% | 50.00% | 100.00% |
| 13 | IFHE 241 | Differential Geometry | MATH317 | B. Sc. Mathematics | FST (IcfaiTech) | • To apply Vector Calculus to the description of space curves<br>• To use Evolutes and Involutes for deeper study of space curves<br>• To connect classes of curves with surfaces of Developable and Minimal types<br>• To introduce the Fundamental Forms to describe variation on surfaces<br>• To use Principal and Gauss curvatures to distinguish between surfaces | • Compute Serret-Frenet frames and understand their significance for curves in space<br>• Determine Evolutes and Involutes for various curves<br>• Compute Fundamental Forms and Curvatures for surfaces and appreciate their roles. | 20% | 15.00% | 20% | 45% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | IFHE 241 | Digital Electronics | BMES212 | B. Sc. Mathematics | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 20.00% | 20.00% | 40.00% | 100.00% |
| 15 | IFHE 241 | Electrical Sciences I | BMES211 | B. Sc. Mathematics | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 25.00% | 25.00% | 25.00% | 25.00% | 100.00% |
| 16 | IFHE 241 | Electrical Sciences II | BMES221 | B. Sc. Mathematics | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 25.00% | 30.00% | 20.00% | 25.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(DEEMED-TO-BE UNIVERSITY UNDER SECTION 3 OF THE UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | IFHE 241 | Engineering Graphics | BMTA115 | B. Sc. Mathematics | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 30.00% | 25.00% | 25.00% | 100.00% |
| 18 | IFHE 241 | Engineering Measurements | BMTA222 | B. Sc. Mathematics | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 30.00% | 20.00% | 30.00% | 20.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 | IFHE 241 | Engineering Mechanics | BMES213 | B. Sc. Mathematics | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 15.00% | 25.00% | 15.00% | 45.00% | 100.00% |
| 20 | IFHE 241 | English Language Skills | BMEGL112 | B. Sc. Mathematics | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provide intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 30.00% | 30.00% | 10.00% | 30.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | IFHE 241 | Environmental Science | BMEVS117 | B. Sc. Mathematics | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 25.00% | 25.00% | 25.00% | 25.00% | 100.00% |
| 22 | IFHE 241 | Graph Theory | MATH313 | B. Sc. Mathematics | FST (IcfaiTech) | • To understand and apply the fundamental concepts in graph theory<br>• To apply graph theory based tools in solving practical problems<br>• To improve the proof writing skills | • Explain the basic concepts of graph theory.<br>• apply the basic concepts of mathematical logic<br>• Describe and solve some real time problems using concepts of graph theory | 10% | 15% | 10% | 65% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | IFHE 241 | Higher Calculus | BMMATH123 | B. Sc. Mathematics | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 15.00% | 25.00% | 10.00% | 50.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | IFHE 241 | Internship Program I | BMIP 221 | B. Sc. Mathematics | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 30% | 30% | 20% | 20% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | IFHE 241 | Internship Program II | BMIP401 | B. Sc. Mathematics | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 30% | 30% | 20% | 20% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | IFHE 241 | Linear Algebra | BMMATH113 | B. Sc. Mathematics | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 15.00% | 25.00% | 10.00% | 50.00% | 100.00% |
| 27 | IFHE 241 | Metric Spaces | MATH323 | B. Sc. Mathematics | FST (IcfaiTech) | • Concept and examples of Metric spaces motivated by the real line<br>• Convergence and Completeness in Metric spaces<br>• Continuity in Metric spaces,criteria and characterization<br>• Fixed Point theorems introduced | • Understand and apply Real Analysis beyond Advanced Calculus. | 20% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | IFHE 241 | Numerical Methods | BMAO311 | B. Sc. Mathematics | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 20% | 25% | 100.00% |
| 29 | IFHE 241 | Optimization Techniques | BMAO225 | B. Sc. Mathematics | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 40% | 10% | 30% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | IFHE 241 | Partial Differential Equations & Systems of ODEs | MATH221 | B. Sc. Mathematics | FST (IcfaiTech) | • Evaluate first order differential equations including separable, homogeneous, exact, and linear.<br>• Show existence and uniqueness of solutions.<br>• Solve second order and higher order linear differential equations.<br>• Create and analyze mathematical models using higher order differential equations to solve application problems such as harmonic oscillator and circuits.<br>• Solve differential equations using variation of parameters<br>• Solve linear systems of ordinary differential equations<br><br>• Introduce students to partial differential equations.<br>• Introduce students to how to solve linear Partial Differential with different methods.<br>• To derive heat and wave equations in 2D and 3D. | • The student will be able to solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous, or Bernoulli cases.<br>• The student will be able to find the complete solution of a nonhomogeneous differential equation as a linear combination of the complementary function and a particular solution.<br>• The student will be introduced to the complete solution of a nonhomogeneous differential equation with constant coefficients by the method of undetermined coefficients.<br>• The student will have a working knowledge of basic application problems described by second order linear differential equations with constant coefficients.<br>• Solve linear partial differential equations of both first and second order<br>• Apply partial derivative equation techniques to predict the behaviour of certain phenomena.<br>• Apply to specific methodologies, techniques and resources to conduct research and produce innovative results in the area of specialisation.<br>• Identify real phenomena as models of partial derivative equations. | 10% | 30% | 10% | 50% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | IFHE 241 | Physics II | BMPHY124 | B. Sc. Mathematics | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 32 | IFHE 241 | Physics I | BMPHY114 | B. Sc. Mathematics | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 33 | IFHE 241 | Principles of Economics | BMECON214 | B. Sc. Mathematics | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 25.00% | 35.00% | 10.00% | 30.00% | 100.00% |
| 34 | IFHE 241 | Principles of Management | BMMGTS224 | B. Sc. Mathematics | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 25.00% | 35.00% | 10.00% | 30.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | IFHE 241 | Probability and Statistics | BMAO122 | B. Sc. Mathematics | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 15.00% | 35.00% | 10.00% | 40.00% | 100.00% |
| 36 | IFHE 241 | Professional Communication | BMTA223 | B. Sc. Mathematics | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 25.00% | 40.00% | 20.00% | 15.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | IFHE 241 | Real Analysis | MATH311 | B. Sc. Mathematics | FST (IcfaiTech) | • To learn about Real Numbers and the Axiom of Completeness, Sequences and Limits of Sequences, Infinite Series, Sequences of Functions and Uniform Convergence, Power Series and Taylor Series<br>• The course is all about mathematical proofs. One has to study examples definitions and theorems. Learn certain proof techniques. | • Define the real numbers, least upper bounds, and the triangle inequality.<br>• Define functions between sets; equivalent sets; finite, countable and uncountable sets. Recognize convergent, divergent, bounded, Cauchy and monotone sequences.<br>• Calculate the limit superior, limit inferior, and the limit of a sequence.<br>• Recognize alternating, convergent, conditionally and absolutely convergent series.<br>• Apply the ratio, root, limit and limit comparison tests. | 10% | 25% | 10% | 55% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | IFHE 241 | Rings and Fields | MATH324 | B. Sc. Mathematics | FST (IcfaiTech) | Study fundamental concepts of algebra which include rings, fields, integral domains and relate these concepts to the number systems; to study the division algorithm, factor theorem, remainder theorem and unique factorization theorem as they apply to polynomials over a field and aims to introduce the basic concepts and techniques of Galois Theory. | • show familiarity with the concepts of ring and field, and their main algebraic properties;<br>• use the axioms that define a ring, and know the basic properties of rings arising from these axioms<br>• know how to add and multiply polynomials over arbitrary fields, and be able to use this to define polynomial rings<br>• understand the meaning of the highest common factor of two polynomials, the proof of existence of the hcf, the meaning of 'coprime' in the context of polynomials over fields, and be able to apply the Euclidean Algorithm to compute the hcf of two polynomials f and g in Q[x], and find polynomials a, b such that hcf(f, g) = af + bg<br>• Understand the meaning of the least common multiple of two polynomials, the proof of its uniqueness, and be able to compute lcms in the polynomial ring Q[x].<br>• correctly use the terminology and underlying concepts of Galois theory in a problem-solving context. | 15% | 25.00% | 15% | 45.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | IFHE 241 | Scientific Measurements | BMTA125 | B. Sc. Mathematics | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 30.00% | 20.00% | 20.00% | 30.00% | 100.00% |
| 40 | IFHE 241 | Statistical Methods | MATH316 | B. Sc. Mathematics | FST (IcfaiTech) | The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science like disease modeling, climate prediction and computer networks etc. | CO1 The student will have the knowledge and understanding of how to apply probability concepts and theorems into real world problems. | 20.00% | 30.00% | 20.00% | 30.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41 | IFHE 241 | Stochastic Processes | MATH211 | B. Sc. Mathematics | FST (IcfaiTech) | • The course will consider Markov processes in discrete and continuous time.<br>• Elucidate the power of stochastic processes and their range of applications. | • Demonstrate essential stochastic modelling tools such as Markov chains, Poisson process, formulate & solve problems which involve setting up stochastic models. | 20.00% | 30.00% | 20.00% | 30.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 42 | IFHE 241 | Structure & Properties of Materials | BMES226 | B. Sc. Mathematics | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

FOUNDATION FOR HIGHER EDUCATION HYDERABAD ICFAI FOUNDATION *
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | IFHE 241 | Technology Innovation Project | BMTIP 491 | B. Sc. Mathematics | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 25% | 25% | 25% | 25% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | IFHE 241 | Thermodynamics | BMES121 | B. Sc. Mathematics | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | IFHE 241 | Thesis & Seminar | BMTS401 | B. Sc. Mathematics | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 30% | 30% | 20% | 20% | 100.00% |
| 46 | IFHE 241 | Topology | MATH325 | B. Sc. Mathematics | FST (IcfaiTech) | • Set theory as background for topological spaces<br>• Concept of topology and Connectedness as a topological property<br>• Compactness, its various forms<br>• Separation properties and types of topological spaces | • Apply topological concepts to various structures, like groups, vector spaces and algebras.<br>• Prepare for subjects requiring neighbourhood, continuity and other concepts not in the context of Euclidean space. | 10% | 30.00% | 10% | 50.00% | 100.00% |

FOUNDATION FOR HIGHER EDUCATION HYDERABAD ICFAI

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | IFHE 241 | Workshop Practice | BMTA126 | B. Sc. Mathematics | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 30.00% | 25.00% | 20.00% | 25.00% | 100.00% |
| 48 | IFHE 251 | Introductory Quantum Mechanics | PHY312 | B. Sc. Physics | FST (IcfaiTech) | Connect the historical development of quantum mechanics with previous knowledge and learn the basic properties of quantum world. | Upon successful completion of the course, student will be able to:<br><br>CO1 Apply concepts from linear algebra to construct quantum gates.<br>CO2 Understand the working of three quantum algorithms.<br>CO3 Will understand the crucial concept of entanglement. | 15% | 30% | 15% | 40% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 49 | IFHE 251 | Atomic Molecular & Nuclear Physics | PHY315 | B. Sc. Physics | FST (IcfaiTech) | • Understand atomic/molecular models<br>• Understand the quantum laws governing their spectra<br>• Obtain a basic knowledge of nuclear models and reactions | • To analyze atomic/molecular spectra and interpret the data to predict some properties of matter.<br>• Estimating nuclear binding energies. | 15% | 25% | 10% | 50% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | IFHE 251 | Chemistry | BPCHEM 111 | B. Sc. Physics | FST (IcfaiTech) | · To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 15% | 25% | 15% | 45% | 100.00% |
| 51 | IFHE 251 | Classical Electrodynamics | PHY313 | B. Sc. Physics | FST (IcfaiTech) | • To develop a basic understanding of electric and magnetic fields in the differential form.<br>• To develop a working knowledge of the underlying principles of electrodynamics. | • Calculate fields and potentials for simple charge configurations, both discrete and continuous by applying various laws in electromagnetic theory.<br>• Have a working knowledge of special techniques like method of images, multipole expansion etc. | 15% | 25% | 10% | 50% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 52 | IFHE 251 | Classical Mechanics | PHY323 | B. Sc. Physics | FST (IcfaiTech) | 1. To distinguish between 'inertia frame of reference' and 'non-inertial frame of reference'<br>2. To know how to impose constraints on a system in order to simplify the methods to be used in solving physics problems<br>3. To know what central, conservative and central-conservative forces mathematically understand the conservative theorems of energy, linear momentum and angular Momentum.<br>4. To know the importance of concepts such as generalized coordinates and constrained motion<br>5. To establish that Kepler's laws are just consequences Newton's laws of gravitation and that of motion<br>6. understand Poisson brackets, understand canonical transformations<br>7. To find the linear approximation to any dynamical system near equilibrium and also know how to derive and solve the wave equation for small oscillations. | • Use variational calculus to find the Euler – Lagrange equations<br>• Obtain Hamilton's equations of motion for different systems.<br><br>• Understanding algebraic structure of Poisson brackets.<br>• The student would have understood small oscillations and the motion of rigid bodies. | 15% | 30% | 15% | 40% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
Deemed-to-be University Under Section 3 of the UGC ACT, 1956

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 53 | IFHE 251 | Complex Variables | BPMATH215 | B. Sc. Physics | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 10.0% | 25.0% | 10.0% | 55.0% | 100.00% |
| 54 | IFHE 251 | Computer Programming I | BPTA116 | B. Sc. Physics | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures –- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 15.00% | 40.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 55 | IFHE 251 | Computer Programming II | BPTA127 | B. Sc. Physics | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 15.00% | 40.00% | 10.00% | 35.00% | 100.00% |
| 56 | IFHE 251 | Control Systems | BPAO312 | B. Sc. Physics | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 15% | 35% | 10% | 40% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 57 | IFHE 251 | Differential Equations & Fourier Series | BPMATH216 | B. Sc. Physics | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 10.00% | 20.00% | 20.00% | 50.00% | 100.00% |
| 58 | IFHE 251 | Digital Electronics | BPES212 | B. Sc. Physics | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 20.00% | 20.00% | 40.00% | 100.00% |
| 59 | IFHE 251 | Electrical Sciences I | BPES211 | B. Sc. Physics | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 25.00% | 25.00% | 25.00% | 25.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | IFHE 251 | Electrical Sciences II | BPES221 | B. Sc. Physics | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 25.00% | 30.00% | 20.00% | 25.00% | 100.00% |
| 61 | IFHE 251 | Engineering Graphics | BPTA115 | B. Sc. Physics | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 30.00% | 25.00% | 25.00% | 100.00% |

S. Vijayatatha
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 62 | IFHE 251 | Engineering Measurements | BPTA222 | B. Sc. Physics | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 30.00% | 20.00% | 30.00% | 20.00% | 100.00% |
| 63 | IFHE 251 | Engineering Mechanics | BPES213 | B. Sc. Physics | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 15.00% | 25.00% | 15.00% | 45.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 64 | IFHE 251 | English Language Skills | BPEGL112 | B. Sc. Physics | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 30.00% | 30.00% | 10.00% | 30.00% | 100.00% |
| 65 | IFHE 251 | Environmental Science | BPEVS117 | B. Sc. Physics | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 25.00% | 25.00% | 25.00% | 25.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | IFHE 251 | Higher Calculus | BPMATH123 | B. Sc. Physics | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 15.00% | 25.00% | 10.00% | 50.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | IFHE 251 | Internship Program I | IP 221 | B. Sc. Physics | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 30% | 30% | 20% | 20% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 68 | IFHE 251 | Internship Program II | IP401 | B. Sc. Physics | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 30% | 30% | 20% | 20% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 69 | IFHE 251 | Introduction to Acoustics | PHY326 | B. Sc. Physics | FST (IcfaiTech) | • To provide an introductory view to a wide range of acoustic phenomena, including the theory and principles of acoustics.<br>• Sound propagation in the atmosphere and non-linear acoustics in fluids.<br>• Understanding of acoustic measurements and analysis of acoustic signals. | • Develop a strong understanding of scientific principles underlying the generation and propagation of sound.<br>• Obtain working knowledge of advanced methods for acoustic signal processing. | 20% | 30% | 20% | 30% | 100.00% |
| 70 | IFHE 251 | Introduction to Monte-Carlo Methods | PHY317 | B. Sc. Physics | FST (IcfaiTech) | • To study some important statistical probability distributions<br>• To study stochastic modeling and Monte Carlo simulation methods<br>• To understand the range of applicability of Monte Carlo simulation methods | • Generate random numbers from some probability distributions<br>• Use simple and importance sampling Monte Carlo methods<br>• Apply Monte carlo methods to lattice models | 15% | 35% | 10% | 40% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71 | IFHE 251 | Introduction to Quantum Computation | PHY327 | B. Sc. Physics | FST (IcfaiTech) | • To expose the students to the fundamental concepts of quantum computation and information.<br>• Generalisation of the usual bit concept from computer science that incorporates the quantum phenomena.<br>• To learn three quantum algorithms and show that they are sueprrior to classical algorithms | • Apply concepts from linear algebra to construct quantum gates.<br>• Understand the working of three quantum algorithms.<br>• Will understand the crucial concept of entanglement. | 15% | 25% | 15% | 45% | 100.00% |
| 72 | IFHE 251 | Introduction to Statistical Mechanics | PHY314 | B. Sc. Physics | FST (IcfaiTech) | • To bridge thermodynamics and statistical mechanics<br>• To develop analytical ability to solve simple problems relevant to statistical mechanics<br>• To understand approximations making statistical descriptions possible | • Learn different statistical ensembles, their distribution functions, ranges of applicability and the corresponding thermodynamic potentials<br>• Give an account of the macroscopic and microscopic description of temperature, entropy and free energy and their descriptions in terms of probabilities<br>• Apply the principles of statistical mechanics to selected problems | 15% | 25% | 15% | 45% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73 | IFHE 251 | Linear Algebra | BPMATH113 | B. Sc. Physics | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 15% | 25% | 10% | 50% | 100.00% |
| 74 | IFHE 251 | Nanotechnology | PHY324 | B. Sc. Physics | FST (IcfaiTech) | • To introduce and provide a broad view of the field of nanoscience and nanotechnology to undergraduates<br>• To provide knowledge on the various synthesis and characterization techniques.<br>• To introduce students to the applications of nanomaterials | • describe the basic science behind the properties of materials at the nanometre scale,<br>• understand the various techniques of preparation of nano-materials<br>• describe the principles behind experimental techniques for studying nanomaterials.<br>• understand the inter-disciplinary applications of nanotechnology | 15% | 25% | 15% | 45% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | IFHE 251 | Numerical Methods | BPAO311 | B. Sc. Physics | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 20% | 25% | 100.00% |
| 76 | IFHE 251 | Optics | PHY211 | B. Sc. Physics | FST (IcfaiTech) | • To understand the everyday optics phenomena.<br>• Fundamentals of optics and some of the principles of interference and diffraction phenomena using ray-nature of light and wave-nature of light are discussed. | • Understand ray-based optical system analysis.<br>• Understand the properties of light caused by the wave nature such as interference, diffraction and polarization in terms of wave model and their applications.<br>• Students will develop independent problem solving skills. | 25% | 25% | 15% | 35% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 77 | IFHE 251 | Optimization Techniques | BPAO225 | B. Sc. Physics | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 40% | 10% | 30% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78 | IFHE 251 | Partial Differential Equations & Systems of ODEs | PHY221 | B. Sc. Physics | FST (IcfaiTech) | • Evaluate first order differential equations including separable, homogeneous, exact, and linear.<br>• Show existence and uniqueness of solutions.<br>• Solve second order and higher order linear differential equations.<br>• Create and analyze mathematical models using higher order differential equations to solve application problems such as harmonic oscillator and circuits.<br>• Solve differential equations using variation of parameters<br>• Solve linear systems of ordinary differential equations<br><br>• Introduce students to partial differential equations.<br>• Introduce students to how to solve linear Partial Differential with different methods.<br>• To derive heat and wave equations in 2D and 3D. | • The student will be able to solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous, or Bernoulli cases.<br>• The student will be able to find the complete solution of a nonhomogeneous differential equation as a linear combination of the complementary function and a particular solution.<br>• The student will be introduced to the complete solution of a nonhomogeneous differential equation with constant coefficients by the method of undetermined coefficients.<br>• The student will have a working knowledge of basic application problems described by second order linear differential equations with constant coefficients.<br>• Solve linear partial differential equations of both first and second order<br>• Apply partial derivative equation techniques to predict the behaviour of certain phenomena.<br>• Apply to specific methodologies, techniques and resources to conduct research and produce innovative results in the area of specialisation.<br>• Identify real phenomena as models of partial derivative equations. | 15% | 25% | 15% | 45% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79 | IFHE 251 | Physics II | BPPHY124 | B. Sc. Physics | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20% | 30% | 10% | 40% | 100.00% |
| 80 | IFHE 251 | Physics I | BPPHY114 | B. Sc. Physics | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20% | 30% | 10% | 40% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81 | IFHE 251 | Principles of Economics | BPECON214 | B. Sc. Physics | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 25% | 35% | 10% | 30% | 100.00% |
| 82 | IFHE 251 | Principles of Management | BPMGTS224 | B. Sc. Physics | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 25% | 35% | 10% | 30% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83 | IFHE 251 | Probability and Statistics | BPAO122 | B. Sc. Physics | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | Analyze statistical data graphically using frequency distributions and cummulative frequency distributions.<br>• Analyze statistical data using measures of central tendency, dispersion and location.<br>• Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events.<br>• Translate real-world problems into probability models. | 15% | 35% | 10% | 40% | 100.00% |
| 84 | IFHE 251 | Professional Communication | BPTA223 | B. Sc. Physics | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | "• Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately.<br>" | 25% | 40% | 20% | 15% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 85 | IFHE 251 | Scientific Measurements | BPTA125 | B. Sc. Physics | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 30% | 20% | 20% | 30% | 100.00% |
| 86 | IFHE 251 | Solid State Physics | PHY311 | B. Sc. Physics | FST (IcfaiTech) | • To know and understand the basic theories of solid state structure<br>• To gain knowledge of the basic theories of electronic structure of materials<br>• To describe physical behavior of solids on the basis of solid state theory. | The course aims through a theoretical and experimental approach to give fundamental insights into solid state physics. Knowledge. The candidate should know about: - Characteristic physical properties of different categories of solid materials, with an emphasis on the crystalline state. - A wide spectrum of theoretical approaches to model the mechanical, thermal and electrical properties of solid materials. Skills | 20% | 30% | 15% | 5% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87 | IFHE 251 | Special Theory of Relativity | PHY325 | B. Sc. Physics | FST (IcfaiTech) | • To understand the inadequacy of Newtonian mechanics for exteremely fast moving objects.<br>• Einstein's solution to the breakdown of Galilean relativity.<br>• Relativistic kinematics and Reltivistic dynamics. | • Understand the role of Newtonian mechanics in the larger framework of mechanics.<br>• Understand the theoretical underpinnings of the mass-energy equivalence.<br>• Understand the role of special relativity in electrodynamics. | 15% | 25% | 15% | 45% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 88 | IFHE 251 | Structure & Properties of Materials | BPES226 | B. Sc. Physics | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 89 | IFHE 251 | Technology Innovation Project | TIP 491 | B. Sc. Physics | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 25% | 25% | 25% | 25% | 100.00% |

S. Vijayalakshmi

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University) U/S 3 of the UGC Act, 1956

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90 | IFHE 251 | Thermodynamics | BPES121 | B. Sc. Physics | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91 | IFHE 251 | Thesis & Seminar | TS401 | B. Sc. Physics | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 92 | IFHE 251 | Workshop Practice | BPTA126 | B. Sc. Physics | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 93 | IFHE 242 | Chemistry | IMCCHEM 111 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94 | IFHE 242 | Complex Variables | IMCMATH215 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95 | IFHE 242 | Computer Programming I | IMCTA116 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures — lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 96 | IFHE 242 | Computer Programming II | IMCTA127 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 97 | IFHE 242 | Control Systems | IMCAO312 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 98 | IFHE 242 | Differential Equations & Fourier Series | IMCMATH216 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 99 | IFHE 242 | Digital Electronics | IMCES212 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 100 | IFHE 242 | Electrical Sciences I | IMCES211 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | IFHE 242 | Electrical Sciences II | IMCES221 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 102 | IFHE 242 | Engineering Graphics | IMCTA115 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 103 | IFHE 242 | Engineering Measurements | IMCTA222 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 104 | IFHE 242 | Engineering Mechanics | IMCES213 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 105 | IFHE 242 | English Language Skills | IMCEGL112 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 106 | IFHE 242 | Environmental Science | IMCEVS117 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD NON

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 107 | IFHE 242 | Higher Calculus | IMCMATH123 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 108 | IFHE 242 | Internship Program I | IP 221 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 109 | IFHE 242 | Internship Program II | IP401 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 110 | IFHE 242 | Linear Algebra | IMCMATH113 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 111 | IFHE 242 | Numerical Methods | IMCAO311 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 112 | IFHE 242 | Optimization Techniques | IMCAO225 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 113 | IFHE 242 | Physics II | IMCPHY124 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 114 | IFHE 242 | Physics I | IMCPHY114 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 115 | IFHE 242 | Principles of Economics | IMCECON214 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 116 | IFHE 242 | Principles of Management | IMCMGTS224 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 117 | IFHE 242 | Probability and Statistics | IMCAO122 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 118 | IFHE 242 | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication | IMCTA223 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 119 | IFHE 242 | Scientific Measurements | IMCTA125 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120 | IFHE 242 | Structure & Properties of Materials | IMCES226 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 121 | IFHE 242 | Technology Innovation Project | TIP 491 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 122 | IFHE 242 | Thermodynamics | IMCES121 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 123 | IFHE 242 | Thesis & Seminar | TS401 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | This course thesis is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 124 | IFHE 242 | Workshop Practice | IMCTA126 | B.Sc (Mathematics) and B.Tech (CE) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed to be University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 125 | IFHE 244 | Chemistry | IMDCHEM 111 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 126 | IFHE 244 | Complex Variables | IMDMATH215 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 127 | IFHE 244 | Computer Programming I | IMDTA116 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures — lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 128 | IFHE 244 | Computer Programming II | IMDTA127 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 129 | IFHE 244 | Control Systems | IMDAO312 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 130 | IFHE 244 | Differential Equations & Fourier Series | IMDMATH216 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION DEEMED TO BE UNIVERSITY

REGISTRAR
THE ICFAI FOUNDATION FOR

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 131 | IFHE 244 | Digital Electronics | IMDES212 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 132 | IFHE 244 | Electrical Sciences I | IMDES211 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 133 | IFHE 244 | Electrical Sciences II | IMDES221 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 134 | IFHE 244 | Engineering Graphics | IMDTA115 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 135 | IFHE 244 | Engineering Measurements | IMDTA222 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 136 | IFHE 244 | Engineering Mechanics | IMDES213 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 137 | IFHE 244 | English Language Skills | IMDEGL112 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 138 | IFHE 244 | Environmental Science | IMDEVS117 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 139 | IFHE 244 | Higher Calculus | IMDMATH123 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 140 | IFHE 244 | Internship Program I | IP 221 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 141 | IFHE 244 | Internship Program II | IP401 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | """CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 142 | IFHE 244 | Linear Algebra | IMDMATH113 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 143 | IFHE 244 | Numerical Methods | IMDAO311 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 144 | IFHE 244 | Optimization Techniques | IMDAO225 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 145 | IFHE 244 | Physics II | IMDPHY124 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 146 | IFHE 244 | Physics I | IMDPHY114 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 147 | IFHE 244 | Principles of Economics | IMDECON214 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 148 | IFHE 244 | Principles of Management | IMDMGTS224 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 149 | IFHE 244 | Probability and Statistics | IMDAO122 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 150 | IFHE 244 | Professional Communication | IMDTA223 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 151 | IFHE 244 | Scientific Measurements | IMDTA125 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve: Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 152 | IFHE 244 | Structure & Properties of Materials | IMDES226 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 153 | IFHE 244 | Technology Innovation Project | TIP 491 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 154 | IFHE 244 | Thermodynamics | IMDES121 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)
ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 155 | IFHE 244 | Thesis & Seminar | TS401 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 156 | IFHE 244 | Workshop Practice | IMDTA126 | B.Sc (Mathematics) and B.Tech (DS&AI) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 157 | IFHE 243 | Chemistry | IMCSCHEM 111 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 158 | IFHE 243 | Complex Variables | IMCSMATH215 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 159 | IFHE 243 | Computer Programming I | IMCSTA116 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures — lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 160 | IFHE 243 | Computer Programming II | IMCSTA127 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 161 | IFHE 243 | Control Systems | IMCSAO312 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 162 | IFHE 243 | Differential Equations & Fourier Series | IMCSMATH216 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 163 | IFHE 243 | Digital Electronics | IMCSES212 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 164 | IFHE 243 | Electrical Sciences I | IMCSES211 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | IFHE 243 | Electrical Sciences II | IMCSES221 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 166 | IFHE 243 | Engineering Graphics | IMCSTA115 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views.<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 167 | IFHE 243 | Engineering Measurements | IMCSTA222 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 168 | IFHE 243 | Engineering Mechanics | IMCSES213 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 169 | IFHE 243 | English Language Skills | IMCSEGL112 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 170 | IFHE 243 | Environmental Science | IMCSEVS117 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 171 | IFHE 243 | Higher Calculus | IMCSMATH123 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 172 | IFHE 243 | Internship Program I | IP 221 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 173 | IFHE 243 | Internship Program II | IP401 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

HIGHER EDUCATION FOR HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 174 | IFHE 243 | Linear Algebra | IMCSMATH113 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 175 | IFHE 243 | Numerical Methods | IMCSAO311 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 176 | IFHE 243 | Optimization Techniques | IMCSAO225 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 177 | IFHE 243 | Physics II | IMCSPHY124 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 178 | IFHE 243 | Physics I | IMCSPHY114 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 179 | IFHE 243 | Principles of Economics | IMCSECON214 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 180 | IFHE 243 | Principles of Management | IMCSMGTS224 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 181 | IFHE 243 | Probability and Statistics | IMCSAO122 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 182 | IFHE 243 | Professional Communication | IMCSTA223 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 183 | IFHE 243 | Scientific Measurements | IMCSTA125 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 184 | IFHE 243 | Structure & Properties of Materials | IMCSES226 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 185 | IFHE 243 | Technology Innovation Project | TIP 491 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 186 | IFHE 243 | Thermodynamics | IMCSES121 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 187 | IFHE 243 | Thesis & Seminar | TS401 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 188 | IFHE 243 | Workshop Practice | IMCSTA126 | B.Sc (Mathematics) and B.Tech(CSE) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 189 | IFHE 246 | Chemistry | IMMCHEM 111 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 190 | IFHE 246 | Complex Variables | IMMMATH215 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HI
(Deemed-to-be-University Under Sect

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 191 | IFHE 246 | Computer Programming I | IMMTA116 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures — lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 192 | IFHE 246 | Computer Programming II | IMMTA127 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 193 | IFHE 246 | Control Systems | IMMAO312 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 194 | IFHE 246 | Differential Equations & Fourier Series | IMMMATH216 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 195 | IFHE 246 | Digital Electronics | IMMES212 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 196 | IFHE 246 | Electrical Sciences I | IMMES211 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 197 | IFHE 246 | Electrical Sciences II | IMMES221 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 198 | IFHE 246 | Engineering Graphics | IMMTA115 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 199 | IFHE 246 | Engineering Measurements | IMMTA222 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 200 | IFHE 246 | Engineering Mechanics | IMMES213 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 201 | IFHE 246 | English Language Skills | IMMEGL112 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 202 | IFHE 246 | Environmental Science | IMMEVS117 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 203 | IFHE 246 | Higher Calculus | IMMMATH123 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 204 | IFHE 246 | Internship Program I | IP 221 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 205 | IFHE 246 | Internship Program II | IP401 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 206 | IFHE 246 | Linear Algebra | IMMMATH113 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 207 | IFHE 246 | Numerical Methods | IMMAO311 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 208 | IFHE 246 | Optimization Techniques | IMMAO225 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 209 | IFHE 246 | Physics II | IMMPHY124 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 210 | IFHE 246 | Physics I | IMMPHY114 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 211 | IFHE 246 | Principles of Economics | IMMECON214 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 212 | IFHE 246 | Principles of Management | IMMMGTS224 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 213 | IFHE 246 | Probability and Statistics | IMMAO122 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 214 | IFHE 246 | Professional Communication | IMMTA223 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 215 | IFHE 246 | Scientific Measurements | IMMTA125 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 216 | IFHE 246 | Structure & Properties of Materials | IMMES226 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 217 | IFHE 246 | Technology Innovation Project | TIP 491 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 218 | IFHE 246 | Thermodynamics | IMMES121 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 219 | IFHE 246 | Thesis & Seminar | TS401 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 220 | IFHE 246 | Workshop Practice | IMMTA126 | B.Sc (Mathematics) and B.Tech(Mechatronics) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221 | IFHE 245 | Chemistry | IMECHEM 111 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 222 | IFHE 245 | Complex Variables | IMEMATH215 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 223 | IFHE 245 | Computer Programming I | IMETA116 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures –- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 224 | IFHE 245 | Computer Programming II | IMETA127 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 225 | IFHE 245 | Control Systems | IMEAO312 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 226 | IFHE 245 | Differential Equations & Fourier Series | IMEMATH216 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 227 | IFHE 245 | Digital Electronics | IMEES212 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 228 | IFHE 245 | Electrical Sciences I | IMEES211 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 229 | IFHE 245 | Electrical Sciences II | IMEES221 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 230 | IFHE 245 | Engineering Graphics | IMETA115 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 231 | IFHE 245 | Engineering Measurements | IMETA222 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 232 | IFHE 245 | Engineering Mechanics | IMEES213 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 233 | IFHE 245 | English Language Skills | IMEEGL112 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 234 | IFHE 245 | Environmental Science | IMEEVS117 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 235 | IFHE 245 | Higher Calculus | IMEMATH123 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 236 | IFHE 245 | Internship Program I | IP 221 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 237 | IFHE 245 | Internship Program II | IP401 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 238 | IFHE 245 | Linear Algebra | IMEMATH113 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 239 | IFHE 245 | Numerical Methods | IMEAO311 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | IFHE 245 | Optimization Techniques | IMEAO225 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 241 | IFHE 245 | Physics II | IMEPHY124 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 242 | IFHE 245 | Physics I | IMEPHY114 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 243 | IFHE 245 | Principles of Economics | IMEECON214 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 244 | IFHE 245 | Principles of Management | IMEMGTS224 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 245 | IFHE 245 | Probability and Statistics | IMEAO122 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 246 | IFHE 245 | Professional Communication | IMETA223 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 247 | IFHE 245 | Scientific Measurements | IMETA125 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 248 | IFHE 245 | Structure & Properties of Materials | IMEES226 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 249 | IFHE 245 | Technology Innovation Project | TIP 491 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 250 | IFHE 245 | Thermodynamics | IMEES121 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 251 | IFHE 245 | Thesis & Seminar | TS401 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 252 | IFHE 245 | Workshop Practice | IMETA126 | B.Sc (Mathematics) and B.Tech.(ECE) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 253 | IFHE 256 | Chemistry | IPMCHEM 111 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | · To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

S. Vijayalakshmi

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 254 | IFHE 256 | Complex Variables | IPMMATH215 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications. | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 255 | IFHE 256 | Computer Programming I | IPMTA116 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures — lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 256 | IFHE 256 | Computer Programming II | IPMTA127 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 257 | IFHE 256 | Control Systems | IPMAO312 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 258 | IFHE 256 | Differential Equations & Fourier Series | IPMMATH216 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 259 | IFHE 256 | Digital Electronics | IPMES212 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 260 | IFHE 256 | Electrical Sciences I | IPMES211 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 261 | IFHE 256 | Electrical Sciences II | IPMES221 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 262 | IFHE 256 | Engineering Graphics | IPMTA115 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 263 | IFHE 256 | Engineering Measurements | IPMTA222 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 264 | IFHE 256 | Engineering Mechanics | IPMES213 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 265 | IFHE 256 | English Language Skills | IPMEGL112 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 266 | IFHE 256 | Environmental Science | IPMEVS117 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 267 | IFHE 256 | Higher Calculus | IPMMATH123 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 268 | IFHE 256 | Internship Program I | IP 221 0 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 269 | IFHE 256 | Internship Program II | IP401 0 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 270 | IFHE 256 | Linear Algebra | IPMMATH113 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 271 | IFHE 256 | Numerical Methods | IPMAO311 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 272 | IFHE 256 | Optimization Techniques | IPMAO225 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 273 | IFHE 256 | Physics II | IPMPHY124 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 274 | IFHE 256 | Physics I | IPMPHY114 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 275 | IFHE 256 | Principles of Economics | IPMECON214 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 276 | IFHE 256 | Principles of Management | IPMMGTS224 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 277 | IFHE 256 | Probability and Statistics | IPMAO122 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 278 | IFHE 256 | Professional Communication | IPMTA223 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 279 | IFHE 256 | Scientific Measurements | IPMTA125 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act,1956)

FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 280 | IFHE 256 | Structure & Properties of Materials | IPMES226 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br><br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

FOUNDATION FOR HIGHER EDUCATION * HYDERABAD *

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 281 | IFHE 256 | Technology Innovation Project | TIP 491 0 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 282 | IFHE 256 | Thermodynamics | IPMES121 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 283 | IFHE 256 | Thesis & Seminar | TS401 0 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 284 | IFHE 256 | Workshop Practice | IPMTA126 | B.Sc (Physics) and B.Tech (Mechatronics) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 285 | IFHE 252 | Chemistry | IPCCHEM 111 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | · To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 286 | IFHE 252 | Complex Variables | IPCMATH215 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ HYDERABAD ★

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 287 | IFHE 252 | Computer Programming I | IPCTA116 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures — lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 288 | IFHE 252 | Computer Programming II | IPCTA127 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 289 | IFHE 252 | Control Systems | IPCAO312 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 290 | IFHE 252 | Differential Equations & Fourier Series | IPCMATH216 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University, Under Section 3 of the UGC Act, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 291 | IFHE 252 | Digital Electronics | IPCES212 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 292 | IFHE 252 | Electrical Sciences I | IPCES211 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 293 | IFHE 252 | Electrical Sciences II | IPCES221 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 294 | IFHE 252 | Engineering Graphics | IPCTA115 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 295 | IFHE 252 | Engineering Measurements | IPCTA222 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve: Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 296 | IFHE 252 | Engineering Mechanics | IPCES213 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 297 | IFHE 252 | English Language Skills | IPCEGL112 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 298 | IFHE 252 | Environmental Science | IPCEVS117 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 299 | IFHE 252 | Higher Calculus | IPCMATH123 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | IFHE 252 | Internship Program I | IP 221 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 301 | IFHE 252 | Internship Program II | IP401 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 302 | IFHE 252 | Linear Algebra | IPCMATH113 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 303 | IFHE 252 | Numerical Methods | IPCAO311 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 304 | IFHE 252 | Optimization Techniques | IPCAO225 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 305 | IFHE 252 | Physics II | IPCPHY124 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 306 | IFHE 252 | Physics I | IPCPHY114 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 307 | IFHE 252 | Principles of Economics | IPCECON214 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 308 | IFHE 252 | Principles of Management | IPCMGTS224 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 309 | IFHE 252 | Probability and Statistics | IPCAO122 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 310 | IFHE 252 | Professional Communication | IPCTA223 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 311 | IFHE 252 | Scientific Measurements | IPCTA125 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 312 | IFHE 252 | Structure & Properties of Materials | IPCES226 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 313 | IFHE 252 | Technology Innovation Project | TIP 491 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 314 | IFHE 252 | Thermodynamics | IPCES121 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 315 | IFHE 252 | Thesis & Seminar | TS401 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 316 | IFHE 252 | Workshop Practice | IPCTA126 | B.Sc (Physics) and B.Tech(CE) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 317 | IFHE 253 | Chemistry | IPCSCHEM 111 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

S.V Jayalakshmi

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 318 | IFHE 253 | Complex Variables | IPCSMATH215 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 319 | IFHE 253 | Computer Programming I | IPCSTA116 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures -- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 320 | IFHE 253 | Computer Programming II | IPCSTA127 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 321 | IFHE 253 | Control Systems | IPCSAO312 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 322 | IFHE 253 | Differential Equations & Fourier Series | IPCSMATH216 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 323 | IFHE 253 | Digital Electronics | IPCSES212 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 324 | IFHE 253 | Electrical Sciences I | IPCSES211 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 325 | IFHE 253 | Electrical Sciences II | IPCSES221 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 326 | IFHE 253 | Engineering Graphics | IPCSTA115 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 327 | IFHE 253 | Engineering Measurements | IPCSTA222 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 328 | IFHE 253 | Engineering Mechanics | IPCSES213 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 329 | IFHE 253 | English Language Skills | IPCSEGL112 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 330 | IFHE 253 | Environmental Science | IPCSEVS117 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 331 | IFHE 253 | Higher Calculus | IPCSMATH123 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 332 | IFHE 253 | Internship Program I | IP 221 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 333 | IFHE 253 | Internship Program II | IP401 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

S.V. Jayadeva Reddy

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 334 | IFHE 253 | Linear Algebra | IPCSMATH113 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 335 | IFHE 253 | Numerical Methods | IPCSAO311 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 336 | IFHE 253 | Optimization Techniques | IPCSAO225 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 337 | IFHE 253 | Physics II | IPCSPHY124 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 338 | IFHE 253 | Physics I | IPCSPHY114 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 339 | IFHE 253 | Principles of Economics | IPCSECON214 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 340 | IFHE 253 | Principles of Management | IPCSMGTS224 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 341 | IFHE 253 | Probability and Statistics | IPCSAO122 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 342 | IFHE 253 | Professional Communication | IPCSTA223 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 343 | IFHE 253 | Scientific Measurements | IPCSTA125 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 344 | IFHE 253 | Structure & Properties of Materials | IPCSES226 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br><br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 345 | IFHE 253 | Technology Innovation Project | TIP 491 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION
HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 346 | IFHE 253 | Thermodynamics | IPCSES121 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 347 | IFHE 253 | Thesis & Seminar | TS401 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 348 | IFHE 253 | Workshop Practice | IPCSTA126 | B.Sc (Physics) and B.Tech(CSE) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 349 | IFHE 254 | Chemistry | IPDCHEM 111 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 350 | IFHE 254 | Complex Variables | IPDMATH215 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 351 | IFHE 254 | Computer Programming I | IPDTA116 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures –- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 352 | IFHE 254 | Computer Programming II | IPDTA127 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 353 | IFHE 254 | Control Systems | IPDAO312 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 354 | IFHE 254 | Differential Equations & Fourier Series | IPDMATH216 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 355 | IFHE 254 | Digital Electronics | IPDES212 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 356 | IFHE 254 | Electrical Sciences I | IPDES211 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 357 | IFHE 254 | Electrical Sciences II | IPDES221 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 358 | IFHE 254 | Engineering Graphics | IPDTA115 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 359 | IFHE 254 | Engineering Measurements | IPDTA222 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 360 | IFHE 254 | Engineering Mechanics | IPDES213 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 361 | IFHE 254 | English Language Skills | IPDEGL112 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 362 | IFHE 254 | Environmental Science | IPDEVS117 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 363 | IFHE 254 | Higher Calculus | IPDMATH123 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

FOUNDATION FOR HIGHER EDUCATION * ICFAI * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 364 | IFHE 254 | Internship Program I | IP 221 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 365 | IFHE 254 | Internship Program II | IP401 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 366 | IFHE 254 | Linear Algebra | IPDMATH113 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 367 | IFHE 254 | Numerical Methods | IPDAO311 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 368 | IFHE 254 | Optimization Techniques | IPDAO225 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 369 | IFHE 254 | Physics II | IPDPHY124 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 370 | IFHE 254 | Physics 1 | IPDPHY114 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 371 | IFHE 254 | Principles of Economics | IPDECON214 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 372 | IFHE 254 | Principles of Management | IPDMGTS224 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 373 | IFHE 254 | Probability and Statistics | IPDAO122 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 374 | IFHE 254 | Professional Communication | IPDTA223 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 375 | IFHE 254 | Scientific Measurements | IPDTA125 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 376 | IFHE 254 | Structure & Properties of Materials | IPDES226 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)
FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 377 | IFHE 254 | Technology Innovation Project | TIP 491 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 378 | IFHE 254 | Thermodynamics | IPDES121 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 379 | IFHE 254 | Thesis & Seminar | TS401 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 380 | IFHE 254 | Workshop Practice | IPDTA126 | B.Sc (Physics) and B.Tech.(DS&AI) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed to be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 381 | IFHE 255 | Chemistry | IPECHEM 111 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 382 | IFHE 255 | Complex Variables | IPEMATH215 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 383 | IFHE 255 | Computer Programming I | IPETA116 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures — lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 384 | IFHE 255 | Computer Programming II | IPETA127 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 385 | IFHE 255 | Control Systems | IPEAO312 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 386 | IFHE 255 | Differential Equations & Fourier Series | IPEMATH216 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 387 | IFHE 255 | Digital Electronics | IPEES212 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 388 | IFHE 255 | Electrical Sciences I | IPEES211 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 389 | IFHE 255 | Electrical Sciences II | IPEES221 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 390 | IFHE 255 | Engineering Graphics | IPETA115 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 391 | IFHE 255 | Engineering Measurements | IPETA222 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 392 | IFHE 255 | Engineering Mechanics | IPEES213 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)
ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 393 | IFHE 255 | English Language Skills | IPEEGL112 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 394 | IFHE 255 | Environmental Science | IPEEVS117 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. V. Jayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 395 | IFHE 255 | Higher Calculus | IPEMATH123 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR
(Deemed-to-be University Under Section

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 396 | IFHE 255 | Internship Program I | IP 221 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

S. Vijayadalli
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 397 | IFHE 255 | Internship Program II | IP401 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 398 | IFHE 255 | Linear Algebra | IPEMATH113 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 399 | IFHE 255 | Numerical Methods | IPEAO311 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 400 | IFHE 255 | Optimization Techniques | IPEAO225 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 401 | IFHE 255 | Physics II | IPEPHY124 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 402 | IFHE 255 | Physics I | IPEPHY114 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 403 | IFHE 255 | Principles of Economics | IPEECON214 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act)

DR. HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 404 | IFHE 255 | Principles of Management | IPEMGTS224 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 405 | IFHE 255 | Probability and Statistics | IPEAO122 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 406 | IFHE 255 | Professional Communication | IPETA223 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 407 | IFHE 255 | Scientific Measurements | IPETA125 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve: Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 408 | IFHE 255 | Structure & Properties of Materials | IPEES226 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 409 | IFHE 255 | Technology Innovation Project | TIP 491 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 410 | IFHE 255 | Thermodynamics | IPEES121 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 411 | IFHE 255 | Thesis & Seminar | TS401 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 412 | IFHE 255 | Workshop Practice | IPETA126 | B.Sc (Physics) and B.Tech.(ECE) | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 413 | IFHE 230 | Analysis of Structures | CE 313 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the methodology of analyzing structures under various loading conditions, to learn different techniques available for the analysis of structures and to understand rolling loads & influence line diagram concepts for analysis | Upon successful completion of the course student will be skilled to apply three moment theorem for structural analysis, perform strain energy concepts in the analysis, and appreciate the importance of the force method and deflection method, make use of rolling loads & influence line diagrams for analysis. The skill development activites exposes the students to the various FEM tools being used in industry and there by enhances employability. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 414 | IFHE 230 | Building Drawing, Estimation & Costing | CE406 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the types of estimates and to learn rate analysis and process of preparation of bills. It also emphasis on the regulations as per national building code and the student will be able to understand line sketches and working drawings of various civil Engineering structures. | Upon successful completion of the course students will be skilled to prepare detailed drawings and estimate for different types of structures and valuation reports and cost quality control. Implement the regulations for layout planning. This course there by enhances the employability of the student in construction industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 415 | IFHE 230 | Chemistry | CECHEM 111 | B.Tech in Civil Engineering | FST (IcfaiTech) | · To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 416 | IFHE 230 | Complex Variables | CEMATH215 | B.Tech in Civil Engineering | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 417 | IFHE 230 | Computer Aided Design | CE403 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to learn the software developing skills for structural design, to learn the fundamentals of Computer Aided Drafting and to study the different software packages for analysis and design | Upon successful completion of the course student will be able to implement Computer Aided Drafting, apply the software skills in the design of infrastructure and run various software packages. After under going the lab activities, the students will be having handson experience with the industry projects and there by increase the employability. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 418 | IFHE 230 | Computer Programming I | CETA116 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures – lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 419 | IFHE 230 | Computer Programming II | CETA127 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 420 | IFHE 230 | Construction Materials &Practices | CE 321 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the physical and mechanical properties of various construction materials, various construction equipments available in construction industry and sequence of activities and co-ordination to be followed in construction industry | Upon completing the course, the students will be skilled to select appropriate construction equipments in construction site, choose the modern construction material appropriate to the climate and functional aspects of the buildings and supervise the construction technique to be followed in brick, stone and hollow block masonry, concreting, flooring, roofing, plastering and painting etc . This will increase the employability of the students. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmy

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 421 | IFHE 230 | Control Systems | CEAO312 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 422 | IFHE 230 | Data Structures | CE 324 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To understand the basics of all data structures.<br>• To choose the appropriate data structure for specific application.<br>• To understand and analyze various searching and sorting algorithms.<br>• To solve the complex problem using hashing, trees and graph. | • Understand how to use data structure concepts for realistic problems.<br>• Ability to identify appropriate data structure for solving computing problems in respective language.<br>• Ability to solve problems independently and think critically. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 423 | IFHE 230 | Design of Concrete Structures | CE 322 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to study the stress strain behavior of steel and concrete, to understand the different philosophies available for the design, to understand the usage of IS codes, to understand the behavior of columns subjected to eccentric load and use of interaction diagrams and to understand basic concepts of prestressed concrete design | Upon successful completion of the course student will be skilled to use IS code of practice for the design of concrete elements, design the beams, slab, column and footing, detail various RCC structural elements and analyze prestressed concrete beams. The skill development activites exposes the students to the various FEM tools being used in industry and there by enhances employability. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 424 | IFHE 230 | Design of Industrial Structures | CE404 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the concept of plastic analysis, to learn the behavior and design of compression member subjected to eccentric load and design of base plate, to learn the design of gantry girder, welded plate girder, stiffeners and connections and to calculate the wind forces on steel stacks as per IS 875 and design the self-supporting steel stacks including base plate and anchor bolts. | Upon completing the course, the students will be able to calculate shape factor and plastic moment capacity, design eccentrically loaded compression members (beam-columns) and their base plates, design welded plate girder with stiffeners and gantry girder, Carry out wind load calculations for tall structures and design steel chimneys. After under going prescribed content, the students will be having handson experience with the industry projects and there by increase the employability. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 425 | IFHE 230 | Design of Steel Structures | CE402 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the concepts of steel design, to learn IS 800-2007 code of practice for the design of compression, tension and flexural members using various cross-sections, to understand the behavior of steel connections and to understand the behavior and design procedure of compression, tension and flexural members. | Upon successful completion of the course student will be able to apply the IS code of practice for the design of steel structural elements, analyze the behavior of bolted connections, design welded connections for both axial and eccentric loads, design compression and tension members, and design simple beam, built up beam and plate girders . The skill development activites exposes the students to the various FEM tools being used in industry and there by enhances employability. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 426 | IFHE 230 | Differential Equations & Fourier Series | CEMATH216 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 427 | IFHE 230 | Digital Electronics | CEES212 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 428 | IFHE 230 | Electrical Sciences I | CEES211 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 429 | IFHE 230 | Electrical Sciences II | CEES221 | B.Tech in Civil Engineering | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 430 | IFHE 230 | Engineering Graphics | CETA115 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 431 | IFHE 230 | Engineering Measurements | CETA222 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 432 | IFHE 230 | Engineering Mechanics | CEES213 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 433 | IFHE 230 | English Language Skills | CEEGL112 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 434 | IFHE 230 | Environmental Geo-technology | CE411 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to learn about the interaction between waste and soil, and pollutant movement in the ground, to understand the role of geotechnical engineering in waste management systems and to study about the waste disposal and management systemand ground remediation technologies | At the end of the course, the student will be skilled to identify the sources of waste and contaminant transport, understand the concept of soil and waste interaction and design landfill liners based on the requirement. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 435 | IFHE 230 | Environmental Impact Assessment | CE418 | B.Tech in Civil Engineering | FST (IcfaiTech) | The aim of this course is to introduce the relevant legal systems and to examine the processes by which normative rules are adopted and enforced, to develop an understanding of the use of EIA procedures and methods within the project and planning cycle to promote more sustainable forms of development and to promote more effective use of Environmental Management Systems and implementation of Environmental requirements. | Upon successful completion of the course student will be skilled to apply the main procedures and methods which are used at different stages in EIA process in Project Appraisal, Decision making and implementation, develop on Environmental Management Systems and develop Environmental law principles in the Regional and International context | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 436 | IFHE 230 | Environmental Science | CEEVS117 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 437 | IFHE 230 | Environmental Systems | CE419 | B.Tech in Civil Engineering | FST (IcfaiTech) | The aims of the environmental systems and societies course are to promote understanding of environmental processes, provide knowledge that can be used in the analysis ofenvironmental issues and promote critical awareness among the students. | On successful completion of this course students will be skilled to recognise the complex structure of environmental systems and demonstrate knowledge of the broader field of integrated modelling of human-environmental systems. It will enhance the employability. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 438 | IFHE 230 | Finite Element Methods | CE401 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to learn the basic concepts of Finite element methods, FEA procedure and its applications. Stiffness method. Element and global stiffness matrix for various structural elements. Isoparametric elements, axisymmetric and 3D analysis use of software in FEM analysis. | Upon successful completion of the course students will be skilled to Model of 1-D, 2_D & 3-D structural problems. Analysis of 1-D, 2_D & 3-D structural problems. Validate and interpret the results. The skill development based lab experiments exposes the students to the various FEM tools being used in industry and there by enhances employability. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 439 | IFHE 230 | Fluid Mechanics | CE 311 | B.Tech in Civil Engineering | FST (IcfaiTech) | Fluid Mechanics is considered as one of the basic subjects for mechanical & civil engineering students as it develops thinking and imaginative capacity of the students. An engineer who successfully copes with new problems in the field must have a sound understanding of fundamental principles. The present course is designed to prepare the students in this direction. The contents of the syllabus have been developed keeping in this mind, so that the students are exposed to a variety of situations that will test their understanding of the subject both at the conceptual and analytical skills. | The student will understand stress-strain relationship in fluids, classify their behavior and also establish force balance in static systems. Further they would develop dimensionless groups that help in scale-up and scale-down of fluid flow systems.<br>Students will be able to apply Bernouli principle and compute pressure drop in flow systems of different configurations.<br>Students will compute power requirement in fixed bed system and determine minimum fluidization velocity in fluidized bed.<br>Students will be skilled to perform the functioning of flow metering devices. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 440 | IFHE 230 | Foundation Engineering | CE407 | B.Tech in Civil Engineering | FST (IcfaiTech) | To understand the essential steps involved in a geotechnical site investigation, to learn the principal types of foundations and the factors governing the choice of the most suitable type of foundation for a given situation and the concepts of bearing capacity, earth pressure and slope stability. | At the end of the course student will be skilled to know the soil investigation techniques, determine the bearing capacity of soil, safe load carrying capacity of soil and select the suitable type of foundation and understand the concept of earth pressure and earth retaining walls. This course there by enhances the employability of the student in construction industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 441 | IFHE 230 | Geo-Informatics in Transportation Engineering | CE412 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to learn the basic concepts of geo-informatics in brief that includes geographical information system (GIS), remote sensing (RS), and global positioning system (GPS), understand these basic concepts in context of transportation and transportation networks, learn the data needs and database development for doing transportation analysis in GIS environment. | Upon completing the course, the students will be skilled to apply GIS and remote sensing techniques for various urban and transportation problems and apply the GIS-based analytical and problem-solving techniques for sustainable planning and management of urban infrastructure and intelligent transportation system problems. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 442 | IFHE 230 | Ground Improvement Techniques | CE408 | B.Tech in Civil Engineering | FST (IcfaiTech) | The aim of this course is to learn about the various ground improvement techniques and to study various methods of dewatering. | Upon successful completion of the course student will be skilled to identify the problems in the soil and select suitable type of ground improvement technique based on the type of problem and soil condition. This course there by enhances the employability of the student in construction industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 443 | IFHE 230 | Hazardous Waste Management | CE416 | B.Tech in Civil Engineering | FST (IcfaiTech) | The aim of this course is to teach the students about the various steps involved in the management of hazardous wastes, to identify the sources of hazardous waste, to study the characteristics of hazardous wastes, to learn handling and processing techniques for hazardous wastes and to know about the various disposal methods for hazardous wastes. | Upon successful completion of the course the student will be skilled to identify various sources of hazardous waste, know the handling and processing techniques of hazardous waste and select the type of disposal technique for a particular type of waste. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 444 | IFHE 230 | Higher Calculus | CEMATH123 | B.Tech in Civil Engineering | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 445 | IFHE 230 | Infrastructure Financing | CE424 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand Infrastructure Development, Financial instruments, Public finance for infrastructure projects, Public-private partnership, PPP Procurement process, and credit rating of infrastructure projects financial institutions in detail. | Upon successful completion of the course students will be able to prepare the project financing plan. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 446 | IFHE 230 | Internship Program I | IP 221 | B.Tech in Civil Engineering | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed to be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 447 | IFHE 230 | Internship Program II | IP401 | B.Tech in Civil Engineering | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 448 | IFHE 230 | Linear Algebra | CEMATH113 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 449 | IFHE 230 | Materials , Management and Estimation | CE426 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand basic principles of surveying, Construction Management, construction materials and estimation of quantities. | The objective of the course is to understand basic principles of surveying, Construction Management, construction materials and estimation of quantities. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ MODERATED

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 450 | IFHE 230 | Mechanics of Solids | CE221 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to learn the concepts of stress, strain, compound stress, section modulus, shear force diagram, bending moment diagram, theory of simple bending, deflection in beams, torsion of shaft and springs, columns and struts, analysis of thin walled and thick walled cylinders. | At the end of the course, the student should be able<br><br>CO1. Able to understand the basic properties of materials<br>CO2. Able to draw SFD, BMD.<br>CO3.The student will be thorough with the behaviour of columns and he will be able to find pressures induced in thin & thick cylinders.<br>CO4.Determination of deflection in beams and springs torque developed in the shafts, through experiments enhances the skill development in students. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 451 | IFHE 230 | Natural Disaster Mitigation and Management | CE423 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to learn about types of natural and environmental disasters, develop skills in various stages of disaster preparedness, mitigation and management | Upon completing the course, the students will be able to develop organizational and Administrative strategies for managing disasters and perform engineering and non-engineering controls of mitigating various natural disasters. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)
ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 452 | IFHE 230 | Numerical Methods | CEAO311 | B.Tech in Civil Engineering | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |
| 453 | IFHE 230 | Optimization Techniques | CEAO225 | B.Tech in Civil Engineering | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 454 | IFHE 230 | Pavement Evaluation, Rehabilitation And Maintenance | CE415 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the use of non-destructive testing for pavement evaluation and learn maintenance and rehabilitation methods to extend the useful life of pavements | Upon completing the course, the students will be skilled to apply management techniques to improve the life-cycle and reduce the cost of pavements and manage pavements more efficiently with insight into pavement defects, and their causes and solutions | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 455 | IFHE 230 | Physics II | CEPHY124 | B.Tech in Civil Engineering | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 456 | IFHE 230 | Physics I | CEPHY114 | B.Tech in Civil Engineering | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 457 | IFHE 230 | Policies, Reforms, Law and Risk Management in Infrastructure Projects | CE425 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand General legal context of infrastructure business, Dispute Resolution, Feasibilities of Infrastructure projects and Risk Analysis in Infrastructure projects | Up on successful completion of the project, the student will be able to understand Infrastructure sectoral polices reforms, and laws in the field of Power Sector/Electricity Oil, Petroleum and Natural Gas, Transport, Telecommunications. And he/she will be in a position to understand the features and Need of the Infrastructure Projects | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 458 | IFHE 230 | Principles of Economics | CEECON214 | B.Tech in Civil Engineering | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 459 | IFHE 230 | Principles of Management | CEMGTS224 | B.Tech in Civil Engineering | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 460 | IFHE 230 | Probability and Statistics | CEAO122 | B.Tech in Civil Engineering | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 461 | IFHE 230 | Professional Communication | CETA223 | B.Tech in Civil Engineering | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 462 | IFHE 230 | Project Planning and Management | CE422 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to know about the basics and importance of construction management, study about the construction contract document, impart the idea about planning and scheduling of activities and scheduling. | Upon completing the course, the students will be skilled to plan, control and execute the real time projects . It will increase the employment oppurtunities. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 463 | IFHE 230 | Railway, Dock and Harbor Engineering | CE413 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the importance of transportation and characteristics of rail transport, dock and harbors. | Upon completing the course, the students will be skilled to design railway, harbors and its different components. This course there by enhances the employability of the students construction industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 464 | IFHE 230 | Remote Sensing & GIS | CE417 | B.Tech in Civil Engineering | FST (IcfaiTech) | The aim of this course is to understand the basic concepts of remote sensing, to study various types of data, image interpretation, image processing and to know the applications of Geographic information systems in Civil Engineering. | Upon successful completion of the course student will be skilled to identify the basic remote sensing concepts and its characteristics, implement the photogrammetry concepts and fundamentals of Air photo Interpretation and use various analysis and interpretation of GIS results. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 465 | IFHE 230 | Scientific Measurements | CETA125 | B.Tech in Civil Engineering | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 466 | IFHE 230 | Soil Dynamics and Machine Foundations | CE409 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of this course is to study the concepts of soil dynamics and wave propagation in soil media, to know the behaviour of the machine foundations and its design and to understand the techniques of foundation isolation. | Upon successful completion of the course student will be skilled to solve geotechnical earthquake engineering problems, identify the pattern of wave propagation, Attenuation of Seismic waves, study the parameters of the soil under dynamic conditions and design Vibration Isolation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 467 | IFHE 230 | Soil Mechanics | CE 312 | B.Tech in Civil Engineering | FST (IcfaiTech) | to introduce students with the essential concepts of the physical properties of soils as a civil engineering material and the fundamental principles of soil mechanics. | At the end of the course, the student should be able<br><br>CO1 Determine index properties of soil<br>CO2 Classify various types of soil<br>CO3 Skilled to determine compaction of soil<br>CO4 Skilled to determine vertical stresses in soil<br>CO5 Skilled to determine shear strength of soil | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 468 | IFHE 230 | Stability of Structures | CE405 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the behavior of indeterminate structures, to learn the concepts of elastic analysis and plastic analysis, to understand the concepts of matrix analysis of structures, to learn basic principles in finite element analysis | Upon successful completion of the course student will be skilled to distinguish determinate and indeterminate structures, analyze indeterminate structures including arches, and apply matrix methods of analysis in FEM and there by increases the employability. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 469 | IFHE 230 | Structure & Properties of Materials | CEES226 | B.Tech in Civil Engineering | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 470 | IFHE 230 | Structures on Expansive Soils | CE410 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of this course is to know the occurrence and distribution of expansive soils, to study the properties of expansive soils, to understand various methods of prediction of heave, to study the design procedure for foundation on expansive soils and to learn various methods of stabilization used in expansive soils. | At the end of the course, student will be skilled to understand the problems related to expansive soils, predict the heave and select a suitable type of remedial measure, design suitable foundation on expansive soils and carry out suitable Stabilization Technique. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 471 | IFHE 230 | Surveying | CE211 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the necessity and importance of surveying in civil engineering, learn in detail various methods of surveying; linear and angular measurements, leveling, electronic distance measurements, etc | Upon completing the course, the students will be able to carry out linear and angular measurements, levelling, measurements to heights and distances, choose appropriate surveying instrument according to the nature of work and analyze the obtained field data and rectify the errors to get accurate measurements. The knoweldege on Total Station dumpy level and Auto level will enhance employability of students | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 472 | IFHE 230 | Technology Innovation Project | TIP 491 | B.Tech in Civil Engineering | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. V Jayalalitha

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 473 | IFHE 230 | Thermodynamics | CEES121 | B.Tech in Civil Engineering | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 474 | IFHE 230 | Thesis & Seminar | TS401 | B.Tech in Civil Engineering | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 475 | IFHE 230 | Transportation Engineering | CE 323 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand various transportation modes, various components involved in their respective modes and their basic design concepts. | Upon completing the course, the students will be skilled to carry out surveys involved in planning and highway alignment, geometric design and pavement design and identify the requirements of an Airport planning and design. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 476 | IFHE 230 | Urban Transportation Planning | CE414 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to understand the basic concepts involved in urban transportation ,study about transportation planning in the overall regional system and learn about the travel demands forecasting, trip generation and trip distribution. | Upon completing the course, the students will be skilled to perform transportation planning in the overall regional system and perform travel demands forecasting. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 477 | IFHE 230 | Water Resource Engineering | CE 314 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to develop skills in the ground water flow, type of aquifer and yield from the well, to understand the basic types of irrigation, irrigation standards and crop water assessment, to understand the analysis of seepage and to learn various hydraulic structures such as weirs and barrages, gravity dams, earth dams, spillways and cross drainage works | Upon successful completion of the course student will be skilled to develop and analyze hydrographs, find the crop water requirement for various crops in the command area and plan and design of water resource systems. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 478 | IFHE 230 | Water Supply & Waste Water Engineering | CE421 | B.Tech in Civil Engineering | FST (IcfaiTech) | The objective of the course is to learn various aspects related to supply of pure and safe drinking water to communities and the conservation of water, understand the basics of sewage, types of sewers and sewer material, study the functions of different primary treatment units, the features and function of different secondary treatment units and learn the objectives and methods of sewage disposal and methods of solid waste and sludge management | Upon completing the course the students will be able to identify the type of unit operations and processes involved in water and wastewater treatment plants. He/she will be skilled design individual unit operation or process appropriate to the situation by applying physical, chemical, biological and engineering principles and it enhances the imployability of the students. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 479 | IFHE 230 | Workshop Practice | CETA126 | B.Tech in Civil Engineering | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 480 | IFHE231 | Advanced Computer Architecture | CS418 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To understand pipelining, instruction set architectures and memory addressing.<br>• To understand symmetric shared-memory architectures and their performance.<br>• To understand multiprocessor cache coherence using the directory based and snooping class of protocols.<br>• To understand the various models to achieve memory consistency.<br>• To understand the architectural aspects practically few case studies are included | • Design basic and intermediate RISC pipelines, including the instruction set, data paths, and ways of dealing with pipeline hazards.<br>• Consider various techniques of instruction-level parallelism, including superscalar execution, branch prediction, and speculation, in design of high-performance processors.<br>• State and understand memory hierarchy design, memory access time formula, performance improvement techniques, and trade-offs.<br>• State and compare properties of shared memory and distributed multiprocessor systems and cache coherency protocols.<br>• Learn from additional topics in computer architecture, such as multi-core processors, thread-level parallelism, and warehouse computing.<br>• Design, implement, and assign parallel tasks to a specific processors using MPI (Message Passing Interface) | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 481 | IFHE231 | Advanced JAVA | CS408 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To learn to build applications using advanced Java APIs. To be able to design and implement stand alone applications and web applications.<br>• To be able to use intermediate level features of Java programming language, like IO, thread control, network API and database access<br>• To understand construction of web applications using the servlet API, JSP technology, and other server Java technology<br>• To understand the role of frameworks in application development.<br>• To understand the concepts with hands on experience and development | • Consider various techniques of instruction-level parallelism, including superscalar execution, branch prediction, and speculation, in design of high-performance processors. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 482 | IFHE231 | Chemistry | CSCHEM 111 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | · To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • State and understand memory hierarchy design, memory access time formula, performance improvement techniques, and trade-offs. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 483 | IFHE231 | Complex Variables | CSMATH215 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • State and compare properties of shared memory and distributed multiprocessor systems and cache coherency protocols. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |
| 484 | IFHE231 | Computer Graphics | CS412 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • This basic course makes the student aimed with topics including anti-aliasing, fractal objects representations methods, ray tracing, spline curves and surface, 2D, 3D modeling and Rendering methods.<br>• The standard software like Graphical Kernel System (GKS), OpenGL, Simple Raster Scan Graphics Package (SRGP), and other Post Scripts interpreters for page descriptions and a variety of painting, drawing and designs, has impacted the human nature blended with splendid colors. | • Learn from additional topics in computer architecture, such as multi-core processors, thread-level parallelism, and warehouse computing. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 485 | IFHE231 | Computer Networks | CS 323 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Build an understanding of the fundamental concepts of data communication and computer networking<br>• To study the foundational principles, architectures, and techniques employed in computer networks.<br>• To study the concepts of communication networks, protocols and their performance<br>• Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks<br>• To study TCP & UDP socket and RIP, OSPF routing protocols | • Design, implement, and assign parallel tasks to a specific processors using MPI (Message Passing Interface) | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 486 | IFHE231 | Computer Organization & Architecture | CS 322 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To have a thorough understanding of the basic structure and operation of a digital computer.<br>• To study the different ways of communicating with I/O devices and standard I/O interfaces.<br>• To impart an understanding of the internal organization and operations of a computer.<br>• To introduce the concepts of processor logic design and control logic design. | • Identify the basic structure and functional units of a digital computer.<br>• Analyze the effect of addressing modes on the execution time of a program.<br>• Design processing unit using the concepts of ALU and control logic design.<br>• Identify the pros and cons of different types of control logic design in processors.<br>• Select appropriate interfacing standards for I/O devices.<br>• Identify the roles of various functional units of a computer in instruction execution | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 487 | IFHE231 | Computer Programming I | CSTA116 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures –- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 488 | IFHE231 | Computer Programming II | CSTA127 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 489 | IFHE231 | Control Systems | CSAO312 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 490 | IFHE231 | Cyber Security | CS407 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Safeguard national critical information infrastructure.<br>• To respond to resolve and recover from cyber incidents and attacks through timely information sharing, collaboration, and action.<br>• To establish a legal and regulatory framework to enable a safe and vibrant cyberspace, Foster a culture of cyber security that promotes safe and appropriate use of cyberspace.<br>• To develop and cultivate national cyber security capabilities.<br>• Security breaches , vulnerabilities and threats | • Understand the concept of cyber security.<br>• Identify different types of cyber attacks.<br>• Know various cyber security issues and policies in different sectors like financing, banking, healthcare etc.<br>• Understand and analyze various security threats and vulnerabilities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 491 | IFHE231 | Data Structures | CS221 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To understand the basics of all data structures.<br>• To choose the appropriate data structure for specific application.<br>• To understand and analyze various searching and sorting algorithms.<br>• To solve the complex problem using hashing, trees and graph. | • Understand how to use data structure concepts for realistic problems.<br>• Ability to identify appropriate data structure for solving computing problems in respective language.<br>• Ability to solve problems independently and think critically. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 492 | IFHE231 | Database Administration | CS401 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To understand the role of a database management system in an organization.<br>• To understand the role of the database administrator.<br>• To gain a conceptual understanding of the Oracle database architecture and how its components work and interact with one another.<br>• To understand performance monitoring, database security, user management, and backup/recovery techniques.<br>• Understand the Industry oriented DBA projects through Case Study | • properly install, configure and tune a database administer servers and server groups<br>• properly manage and optimize schemas, tables, indexes, and views<br>• properly create logins, configure permissions, assign roles, and perform other essential security tasks<br>• properly monitor server activity and resolve performance issues<br>• take charge of automation and maintenance<br>• plan and implement a comprehensive backup and recovery strategy<br>• Develop Various Case Studies in the Industry | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 493 | IFHE231 | Database Management Systems | CS 314 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To provide a general introduction to relational model<br>• To learn about data modelling through ER diagrams<br>• To learn about Normalization<br>• To learn about SQL commands<br>• To learn about Query Processing and Transaction Management | • Understand database concepts and structures.<br>• Understand data modeling and database development processes using SQL.<br>• Construct and normalize conceptual data models.<br>• Become proficient in using database query language, i.e., SQL. using MySQL<br>• Understand the issues related to database performance,transaction Management and crash recovery | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 494 | IFHE231 | Database Security & Privacy | CS403 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Open availability of robust, strong cryptography, A Secure Name Infrastructure<br>• A Secure Forwarding Infrastructure, Encryption by default.<br>• A Useful Privacy and Security Public Policy Framework. | • Understand the basic concepts of data security such as Confidentiality, Integrity, Authentication, Key management, and their relevance in various Contexts of Network Communication.<br>• Understand the security mechanisms applied to the Distributed Database Management System in Real time communication.<br>• Understand the various security aspects in Expert System along with their protocols and architecture.<br>• Understand the data privacy policies applied to distribute data mining along with various protocols used for encryption and key management. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 495 | IFHE231 | Design &Analysis of Algorithms | CS 324 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To analyze performance of algorithms.<br>• To choose the appropriate data structure and algorithm design method for a specified application.<br>• To understand how the choice of data structures and algorithm design methods impacts the performance of programs.<br>• To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.<br>• To understand the differences between tractable and intractable problems.<br>• To introduce P and NP classes.<br>• To implement the algorithm/Logic of a problem in a computer program such as C/C++ etc. | • Ability to analyze the performance of algorithms.<br>• Ability to choose appropriate algorithm design techniques for solving problems.<br>• Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.<br>• Ability to implement algorithms in a programming environment. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 496 | IFHE231 | Differential Equations & Fourier Series | CSMATH216 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 497 | IFHE231 | Digital Electronics | CSES212 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To understand how the choice of data structures and algorithm design methods impacts the performance of programs. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 498 | IFHE231 | Discrete Structures for Computer Science | CS211 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound. | Upon successful completion of the course, student will be able to:<br>• use logical notation to determine if an argument is valid<br>• write and evaluate a proof<br>• Use graph theory in optimal circuit design<br>• understand the basics of Boolean Algebra and Lattices<br>• design and analyse algorithms<br>• analyse phrase structure grammars for languages<br>• develop error-correcting codes<br>• apply Number Theory in cryptography for computer security | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 499 | IFHE231 | Electrical Sciences I | CSES211 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 500 | IFHE231 | Electrical Sciences II | CSES221 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 501 | IFHE231 | Engineering Graphics | CSTA115 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 502 | IFHE231 | Engineering Measurements | CSTA222 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Describe and make calculations of plane electromagnetic waves in homogeneous media,including reflection of such waves in plane boundaries between homogeneous media. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 503 | IFHE231 | Engineering Mechanics | CSES213 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • "• Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions.<br>" | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 504 | IFHE231 | English Language Skills | CSEGL112 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | "• Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc.<br>" | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 505 | IFHE231 | Environmental Science | CSEVS117 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | "• Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 506 | IFHE231 | High Performance Computing | CS417 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • The overall goal is to acquaint students who anticipate doing independent work that may benefit from large-scale simulation with current hardware, software tools, practices, and trends in parallel scientific computing.<br>• To provide an opportunity to build and execute sample parallel codes to enhance performance of the general purpose computing systems.<br>• The software employed in course examples is freely available. The course is also designed to make students intelligent consumers and critics of parallel scientific computing literature and conferences.<br>• The focus is on algorithms that can scale to the frontier of current and likely future high performance architectures.<br>• Significant reference is made to applications that drive the push towards high performance. | • Parallel Computing knowledge on OPENMP<br>• New Processor Architectures.<br>• Power-Aware Computing and Communication.<br>• Advanced Topics on Peta-scale Computing and Optical Systems | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 507 | IFHE231 | Higher Calculus | CSMATH123 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 508 | IFHE231 | Internship Program I | IP 221 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 509 | IFHE231 | Internship Program II | IP401 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 510 | IFHE231 | Linear Algebra | CSMATH113 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 511 | IFHE231 | Microprocessor Programming & Interfacing | CS 311 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • This subject deals about the basics of 8-bit and 16-bit Microprocessor, their architectures, internal organization and their functions, peripherals and interfacing.<br>• The objective of the course is to enable the students to acquire Assembly language programming skill which is the real essence of Microprocessor.<br>• The student can learn how a microprocessor is interfaced with wide variety of low-level I/O devices. | • Recall and apply the basic concept of digital fundamentals to Microprocessorbased personal computer system.<br>• Identify the detailed s/w & h/w structure of the Microprocessor.<br>• Illustrate how the different peripherals are interfaced with Microprocessor.<br>• Train their practical knowledge through laboratory experiments.<br>• Analyze the data transfer information through serial & parallel ports. | 20.00% | 35.00% | 10.00% | 35.00% | |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 512 | IFHE231 | Mobile Application Development | CS409 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Add multiple activities & associated layouts to an Android project.<br>• Switch between screens display a dialog window.<br>• Display and add functionality to a custom menu. | • Explain mobile devices, including their capabilities and limitations.<br>• Describe the components and structure of a mobile development framework.<br>• Use current mobile platforms and their architectures.<br>• Describe and compare different mobile application models/architectures and patterns.<br>• Identify the challenges that mobile programming has in providing an effective user interface<br>• Write mobile application for small devices | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 513 | IFHE231 | Multicore Architecture | CS419 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To understand the need for multi-core processors, and their architecture.<br>• To understand the challenges in parallel and multi-threaded programming. Few case studies included<br>• To learn about the various parallel programming paradigms.<br>• To develop multi-core programs and design parallel solutions using POSIX threads programming. | • Describe multi-core architectures and identify their characteristics and challenges.<br>• Identify the issues in programming Parallel Processors.<br>• Write programs using OpenMP and MPI, and POSIX threads programming.<br>• Design parallel programming solutions to common problems.<br>• Compare and contrast programming for serial processors and programming for parallel processors. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 514 | IFHE231 | Network Administration | CS405 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Able to understand different types of abstract devices.<br>• Able to compute the types of problems to be solved by the machine.<br>• Convert one abstract machine into another machine.<br>Able to understand various routing and routed protocols | • Perform simple PC (hardware, software, network settings) and NIC troubleshooting.<br>• Describe the devices required to buil, d a LAN.<br>• Build and troubleshoot a simple LAN.<br>• Able to understand and configure network management commands, RIP , OSPF routing protocols | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 515 | IFHE231 | Network Security | CS406 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • The key objective of this course is to understand the technologies , methodologies and protocols to secure computer networks<br>• This Course focus towards the introduction of network security using various cryptographic algorithms.<br>• To know the methods of conventional encryption.<br>• To understand the concepts of public key encryption and number theory.<br>• To understand authentication, Hash functions and Digital signatures.<br>• To know the network security tools and applications.<br>• To understand the System security, Transport layer security, IP security, Wireless LAN security and Application level security | • identify Vulnerabilities ,different types of threats and Risk<br>• Write code for relevant cryptographic algorithms and Digest algorithms.<br>• understand security tools like Crypt , Wireshark ,Cain and abel<br>• understand SET,SSL & S/MIME protocols<br>• Determine firewall requirements, and configure a firewall. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 516 | IFHE231 | Numerical Methods | CSAO311 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |
| 517 | IFHE231 | Object Oriented Analysis & Design | CS415 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | This basic course makes the student aimed with topics including Object Oriented System Development and Unified Modeling Language. To understand UML diagrams few unstructured lab experiments will be discussed | • To Gather and specify requirements of the software projects and to analyze software requirements with existing UML tools<br>• To Design and test software using UML tools<br>• To Estimate the project with respect to effort and development time<br>• Take up a software development project and to work in a team as well as independently on software projects. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section [illegible] the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 518 | IFHE231 | Operating Systems | CS 312 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To provide a clear understanding of the concepts that underlie operating systems.<br>• To discuss Process Management and Concurrency control.<br>• To discuss memory management and virtual memory techniques.<br>• To introduce the practical aspects that pertain to the most popular operating systems such as Unix/Linux and Windows.<br>• To improve the programming skills of the students by implementing various operating system principles using C/C++/Java/Python. | • Gain extensive knowledge on principles and difference between different types of modern operating systems, virtual machines and their structure of implementation.<br>• Understand process management, concurrent processes and threads<br>• Compare performance of processor scheduling algorithms.<br>• Able to understand the concepts of deadlock in operating systems and how they can be managed / avoided and implement them in a multiprogramming system.<br>• Produce algorithmic solutions to process synchronization problems.<br>• understand the types of I/O management; disk scheduling, protection and security problems faced by operating systems and how to minimize these problems<br>• Improve their programming skills by implementing various Operating System concepts. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 519 | IFHE231 | Optimization Techniques | CSAO225 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | "• Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems.<br>" | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 520 | IFHE231 | Parallel Computing | CS421 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Parallel computing is pervasive. From embedded devices, laptops.<br>• To high-end supercomputer, and large-scale data centers, parallel computing is widely employed to achieve performance and efficiency targets.<br>• This course introduces the foundations of parallel computing, including parallel architectures, parallel programming methods and techniques, parallel algorithm designs, and parallel performance analysis and some case studies on parallel computing using NVIDIA CUDA programming | • Apply knowledge of computing and mathematics appropriate to the discipline.<br>• Analyze a problem and identify the computing requirements appropriate for its solution; an ability to design, implement and evaluate a parallel computer based system, process, component or program to meet desired needs.<br>• Apply mathematical foundations, algorithmic principles and computer science theory to the modeling and design of computer based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.<br>• Apply design and development principles in the construction of software systems of varying complexity. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 521 | IFHE231 | Physics II | CSPHY124 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To discuss memory management and virtual memory techniques. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 522 | IFHE231 | Physics I | CSPHY114 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To introduce the practical aspects that pertain to the most popular operating systems such as Unix/Linux and Windows. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 523 | IFHE231 | Principles of Economics | CSECON214 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 524 | IFHE231 | Principles of Management | CSMGTS224 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 525 | IFHE231 | Probability and Statistics | CSAO122 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 526 | IFHE231 | Professional Communication | CSTA223 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 527 | IFHE231 | Programming Languages & Compiler Construction | CS 321 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Aim is to learn how to design and implement a compiler<br>• Able to design small compiler using varies tools discussed.<br>• Able to understand how the language is processed by the computer.<br>• What are the different phases of compilation process? | • Understand the complexity in designing the compiler.<br>• Working of compiler.<br>• Develop small compiler using the tools.<br>• Understand the intermediate code generated by compiler. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 528 | IFHE231 | Scientific Measurements | CSTA125 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 529 | IFHE231 | Scripting Languages | CS410 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • This course is an introduction to different scripting languages.<br>• Scripting languages have been around almost since the invention of computers, certainly since the invention of the operating systems.<br>• In describing the world of scripting languages many traditional and modern Scripting have been identified, web scripting form is one of the important one in modern scripting<br>• To understand scripting few unstructured lab experiments and case studies using python and Javascript will be discussed<br>• By end of this course, a student can implement scripts by his/her own and also able to understand scripts written in different scripting languages (like Python, Perl, etc.) | • Understanding the scripts written in different scripting languages.<br>• Writing the scripts using python and perl.<br>• Writing scripts to automate day to day activities which enhances the programming skills and employability<br>• Focus on particular areas of scripting: pattern matching, processing structured text, GUI, Data Analysis, high performance computing, machine learning and structured graphics (Tcl and Tk).<br>• Focused on writing scripts to implement computational methods and algorithms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 530 | IFHE231 | Service Oriented Architecture | CS414 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Offers an overview and critical SOA and service design principles such as loose coupling, interoperability, extensibility, reuse and discoverability.<br>• The integration of XML and SOAP architecture and XML schemas, WSDL web services are explored - capable of being extended to accommodate changing business needs and promote integration simplicity. | • Know the basic concepts of SOA.<br>• Analyze the service and deployment models<br>• Integration of XML and services | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 531 | IFHE231 | Software Engineering | CS413 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To understand the software process models such as waterfall and evolutionary models.<br>• To learn how to implement the agile process models in real projects.<br>• To understand the software requirements and SRS document.<br>• To learn different software architectural styles.<br>• To understand various software testing approaches such as unit, integration,validation and system testing.<br>• To understand the quality control and learn how to ensure good quality software.<br>• To understand software engineering principles and practices by working on real time case studies. | • Identify minimum requirements for developing a software application.<br>• Choose an appropriate process model based on the user requirements.<br>• Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.<br>• Write test cases and can develop a simple test report<br>• Understand the concepts of quality control and can ensure the quality of software. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 532 | IFHE231 | Software Testing Methodologies | CS416 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Understand the software testing methodologies such as flow graphs and path testing, transaction flows testing, data flow testing, domain testing and logic base testing. | • Ability to apply the process of testing and various methodologies in testing for developed software.<br>• Ability to write test cases for given software to test it before delivery to the customer. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 533 | IFHE231 | SQL & DB Applications | CS402 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To familiarize and provide the skills for developing applications using SQL, PL/SQL and NoSQL databases. | • Become proficient in using database query language, i.e., SQL. using My SQL and MongoDB.<br>• Able to develop real world applications using SQL and NoSQL.<br>• To have knowledge of Modern databases. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 534 | IFHE231 | Structure & Properties of Materials | CSES226 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 535 | IFHE231 | Technology Innovation Project | TIP 491 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 536 | IFHE231 | Theory of Computation | CS 313 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Able to understand different types of abstract devices.<br>• Able to compute the types of problems to be solved by the machine.<br>• Convert one abstract machine into another machine. | • Understand the computational capabilities of any machine modal.<br>• Able to decide what are the problems can be solved by machine and what are not possible.<br>• Understand the working of Turing machine.<br>• Understand the different classes of problem. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 537 | IFHE231 | Thermodynamics | CSES121 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 538 | IFHE231 | Thesis & Seminar | TS401 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 539 | IFHE231 | Web Enabled Technologies | CS411 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • Students gain practical experience required for entry into web design and development careers.<br>• Able to use a variety of latest technologies to create responsive websites.<br>• To understand web programming unstructured lab experiments and few case studies using Javascript will be discussed<br>• Understand different frameworks. | • Ability to produce dynamic, flexible and responsive websites which enhances the programming skills and employability<br>• Possess a good working knowledge of different frameworks and technologies | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 540 | IFHE231 | Wireless Networks | CS404 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | • To study the specifications and functionalities of various protocols/standards of wireless networks.<br>• To study the current trends in Wireless Networks. | • Describe the need for the study of wireless and mobile networks.<br>• Describe the main characteristics of mobile IP and how it differs from IP.<br>• Illustrate traffic routing with mobile IP.<br>• Develop applications that rely on wireless data communications including applications for the mobile phone<br>• Describe current and emerging interests in wireless and mobile computing and current capabilities, limitations and potential of each. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 541 | IFHE231 | Workshop Practice | CSTA126 | B.Tech in Computer Science & Engineering | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed to be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 542 | IFHE232 | Artificial Intelligence | DS311 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | An introduction to the basic principles, techniques, and applications of Artificial Intelligence. Coverage includes knowledge representation, logic, inference, problem solving, search algorithms, game theory, perception, learning, planning, and agent design. Students will experience programming in AI language tools. Potential areas of further exploration include expert systems, neural networks, fuzzy logic, robotics, natural language processing, and computer vision. | Upon successful completion of the course, student will be able to:<br>CO1 give an overview of the field of artificial intelligence, its background, history, fundamental issues, challenges and main directions<br>CO2 explain basic concepts, methods and theories for search - account for classical planning of proactive agents<br>CO3 describe methods and theories for reactive agents, architectures based on subsumption, and potential fields<br>CO4 explain concepts, methods and theories of embodied cognition and situatedness and theories of sensing<br>CO5. explain basic concepts, methods and theories of artificial evolution, genetic algorithms, multiple autonomous agents and swarm intelligence | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 543 | IFHE232 | Big Data Systems | DS404 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Student should estimate and analyze different known scientific methods and approaches in terms of data collection, storage and processing.<br>• Student should be capable to make managerial decisions, to assess their consequences and to bear responsibility for the outcomes.<br>• These indicated and contributed during the preparation of explanation and analysis of the particular area for data collection, storage and processing, particular market and business-model.<br>• Students should identify and make prognoses about modern approaches on increasing business efficiency.<br>• Students should identify and choose optimal solutions for improving it-infrastructure and business architecture of the company after implementation relevant big data collection, storage and processing processes.Few Case studies were carried out on Map Reduce Concept, Hive and Spark. | • To understand Big Data concepts, including cloud and big data architectures.<br>• To motivate and explain trade-offs in big data processing technique design and analysis.<br>• To apply non-relational databases, the techniques for storing and processing large<br>• volumes of structured and unstructured data, as well as streaming data.<br>• To Integrate Apache Mahout with newer platforms such as Apache Spark<br>• To meet the industry needs with help of a few case studies discussed and practiced technologies. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 544 | IFHE232 | Blockchain with Artificial Intelligence | DS416 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To teach Hared ledgers, distributed ledgers, bitcoin, and cryptography;<br>• Key concepts of artificial neural networks, machine learning, and deep learning with real-world examples.<br>• Smart services within a Blockchain ecosystem such as classification, regression, and image recognition.<br>• Understanding the Industry oriented projects through Case Study | • Understand Hyperledger framework and its components.<br>• Analysis the application of Blockchain in healthcare, supply chain, finance, energy.<br>• Choose neural network like CNN, RNN, auto encoders for applications.<br>• Apply AI and DL in Blockchain dataset using AI algorithms & models.<br>• Develop Case Study for real life scenario in the Industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 545 | IFHE232 | Blockchain with IoT | DS417 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Introduction to IoT and Blockchain<br>• Creating your own blockchain network with Hyperledger composer<br>• Installing your own blockchain network with Hyperledger Fabric and composer<br>• Addressing Food Safety: Building around the Blockchain regulations, Challenges and concerns in the modern Food chain.<br>• Applications related to IoT, Blockchain and Industry 4.0.<br>• Understanding the Industry oriented projects through Case Study | • Learn the basics and foundational concepts of IoT and Blockchain.<br>• Explore the applications and its uniqueness in depth.<br>• Learn about major tools to develop and deploy Iot with Blockchain.<br>• Understand Hyperledger and Hyperledger Fabric.<br>• Develop Case Study for real life scenario in the Industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 546 | IFHE232 | Chemistry | DSACHEM 111 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 547 | IFHE232 | Cloud Administration | DS413 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Understand all aspects of cloud provisioning and administration<br>• Apply the administration concepts in an enterprise cloud computing environment.<br>• Establish best practices for performance measures and monitoring of cloud computing environment<br>• Understand the Industry oriented projects through Case Study | • Design strategic policies for cloud administration.<br>• Understand various aspects of disaster recovery & security administration.<br>• Analyse various management issues in cloud administration.<br>• Develop Various Case Studies in the Industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 548 | IFHE232 | Complex Variables | DSAMATH215 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | The course covers the basic principles (both theory and applications) of differentiable complex-valued functions of a single complex variable. Topics include the complex number system, Cauchy-Riemann conditions, analytic functions and their properties, special analytic functions including linear fractional transformations, roots, exponential, Log, trigonmetric and hyperbolic functions of a complex variable; Complex integration and line integrals, Cauchy's theorem, Cauchy represenation, conformal mapping, Taylor and Laurent Series expansions; the calculus of residues and various applications. Matlab graphics will be used to provide 4-D graphical representations of analytic functions. | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 549 | IFHE232 | Computer Networks | CS323 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Build an understanding of the fundamental concepts of data communication and computer networking<br>• To study the foundational principles, architectures, and techniques employed in computer networks.<br>• To study the concepts of communication networks, protocols and their performance<br>• Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks<br>• To study TCP & UDP socket and RIP, OSPF routing protocols | • understand basic computer network technology<br>• Understand and explain Data Communications System and its components<br>• Identify the different types of network topologies and protocols<br>• Understand about working of Intranet, LAN, WAN, MAN setups, different topologies<br>• Gain familiarity with common networking protocols and algorithms<br>• Configure network protocols and analyze its performance<br>• Understand , configure, troubleshoot routing protocols using simulators like netsimk and CISCO packet tracer | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 550 | IFHE232 | Computer Programming I | DSATA116 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures –- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 551 | IFHE232 | Computer Programming II | DSATA127 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 552 | IFHE232 | Computer Vision | DS409 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Recognize and describe both the theoretical and practical aspects of computing with images. Connect issues from Computer Vision to Human Vision<br>• Describe the foundation of image formation and image analysis. Understand the basics of 2D and 3D Computer Vision.<br>• Get an exposure to advanced concepts leading to object and scene categorization from images. | • Understand the major technical approaches involved in computer vision.<br>• Describe various methods used for registration, alignment, and matching in images.<br>• Build computer vision applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 553 | IFHE232 | Control Systems | DSAAO312 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 554 | IFHE232 | Data Structures | DS 221 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To understand the basics of all data structures.<br>• To choose the appropriate data structure for specific application.<br>• To understand and analyze various searching and sorting algorithms.<br>• To solve the complex problem using hashing, trees and graph. | • Understand how to use data structure concepts for realistic problems.<br>• Ability to identify appropriate data structure for solving computing problems in respective language.<br>• Ability to solve problems independently and think critically. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 555 | IFHE232 | Data Visualization | DS403 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To get familiar with different visualization techniques using excel, python, Tableau and PowerBI.<br>• To introduce visual perception and core skills for visual analysis.<br>• To understand visualization for information and dashboard design.<br>• To understand the working of visualization software | • Understand and visualize the data in a better way.<br>• Implement different case studies according to the data.<br>• Infer from data and tell stories based on data.<br>• Use different open source tools for data analysis and visualization. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 556 | IFHE232 | Data Warehousing & Mining | DS314 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | 1 Be familiar with mathematical foundations of data mining tools.. 2 Understand and implement classical models and algorithms in data warehouses and data mining 3 Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering. | • Approach business problems data-analytically.<br>• Think carefully & systematically about whether & how data can improve business performance, to make better-informed decisions for management, finance, marketing and some other business activities that lead to employability opportunities.<br>• Interact competently on the topic of data mining for business intelligence. Know the basics of data mining processes, algorithms, & systems well enough to interact with data mining experts, consultants, etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 557 | IFHE232 | Differential Equations & Fourier Series | DSAMATH216 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | "• To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations).<br>" | • Think carefully & systematically about whether & how data can improve business performance, to make better-informed decisions for management, finance, marketing and some other business activities that lead to employability opportunities. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 558 | IFHE232 | Digital Electronics | DSAES212 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | To familiarize with the different number systems, logic gates, and combinational and sequential circuits utilized in the different digital circuits and systems. The course will help in design and analysis of the digital circuit and system | • Interact competently on the topic of data mining for business intelligence. Know the basics of data mining processes, algorithms, & systems well enough to interact with data mining experts, consultants, etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 559 | IFHE232 | Discrete Structures for Computer Science | DS211 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To write an argument using logical notation and determine if the argument is or is not valid<br>• To write and evaluate a proof or outline the basic structure of and give examples of each proof technique<br>• To understand the basic principles of sets and operations in sets<br>• To understand the basics of Boolean algebra and Lattices<br>• To design and analysealgorithms<br>• To study finite state machines<br>• To understand phrase structure grammars<br>• To introduce error-correcting codes<br>• To applyNumber Theory in cryptography. | Upon successful completion of the course, student will be able to:<br>• use logical notation to determine if an argument is valid<br>• write and evaluate a proof<br>• Use graph theory in optimal circuit design<br>• understand the basics of Boolean Algebra and Lattices<br>• design and analyse algorithms<br>• analyse phrase structure grammars for languages<br>• develop error-correcting codes<br>• apply Number Theory in cryptography for computer security | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 560 | IFHE232 | Distributed Cloud Computing | DS410 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Understand the underlying infrastructure and architecture of clouds, techniques for enabling services and the quality of such services.<br>• Analyse various levels of services that can be achieved by cloud computing.<br>• Understand the programming aspects of cloud computing using different tools and techniques.<br>• Identify research related issues of cloud computing in performance, security and management.<br>• Analyse real life case studies and showcase importance of computing models | • Understand the distributed and cloud computing infrastructure, architecture, system models, enabling technologies and its paradigms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 561 | IFHE232 | Electrical Sciences I | DSAES211 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • Analyze the service and deployment models of cloud computing and related issues | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 562 | IFHE232 | Electrical Sciences II | DSAES221 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 563 | IFHE232 | Engineering Graphics | DSATA115 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 564 | IFHE232 | Engineering Measurements | DSATA222 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Describe and make calculations of plane electromagnetic waves in homogeneous media,including reflection of such waves in plane boundaries between homogeneous media. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 565 | IFHE232 | Engineering Mechanics | DSAES213 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • analyse phrase structure grammars for languages | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 566 | IFHE232 | English Language Skills | DSAEGL112 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • develop error-correcting codes | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 567 | IFHE232 | Environmental Science | DSAEVS117 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • apply Number Theory in cryptography for computer security | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 568 | IFHE232 | Ethereum & Solidity Programming Essentials | DS415 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To Introduce Block chain, Ethereum, and Smart Contracts.<br>• Installing Ethereum and Solidity, Global Variables and Functions.<br>• Expressions and Control Structures.<br>• Writing Smart Contracts, Functions, Modifiers, and Fallbacks, Exceptions, Events, and Logging, Truffle Basics.<br>• Unit Testing, Debugging Contracts.<br>• Understanding the Industry oriented projects through Case Study | • Learn the basics and foundational concepts of Solidity and Ethereum.<br>• Explore the Solidity language and its uniqueness in depth.<br>• Create new accounts and submit transactions to blockchain.<br>• Get to know the complete language in detail to write smart contracts.<br>• Learn about major tools to develop and deploy smart contracts.<br>• Write defensive code using exception handling and error checking.<br>• Understand Truffle basics and the debugging process.<br>• Develop Case Study for real life scenario in the Industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 569 | IFHE232 | Expert Systems | DS322 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Describe the concepts central to the creation of expert systems.<br>• Illustrate the tools and the processes used for the creation of an expert system.<br>• Demonstrate methods used to evaluate the performance of an expert system.<br>• Conduct an in-depth examination of existing expert systems.<br>• Describe the program structure of LISP and PROLOG.<br>• Few Case studies were carried out on Expert Systems and Knowledge Representation. | • Define and describe the expert system and its main constituents.<br>• Distinguish class of problems suitable for solving with expert systems.<br>• Breakdown the problem and select crucial parts.<br>• Assemble various parts of knowledge and skills in order to devise the approach to solution.<br>• Design and create an expert system suitable for solving particular problems.<br>• Appraise the quality of solution and justify the employed techniques.<br>• To meet the industry needs with help of a few case studies discussed and practiced technologies. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 570 | IFHE232 | Fundamentals of Blockchain Technology. | DS414 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Understand the fundamentals of Blockchain Technology.<br>• Identify, analyze, and model structural and behavioral concepts of the Blockchain system.<br>• Develop, explore the conceptual model into various scenarios and applications.<br>• Apply the concepts of architectural design for deploying the code for Blockchain Application.<br>• Understanding the Industry oriented projects through Case Study | • Understand the building blocks of Blockchain technology and explore the vast spectrum of Blockchain applications.<br>• Assess, select and customize technologies for Blockchain applications.<br>• Integrate geographically distributed devices with diverse capabilities.<br>• Design and implement Blockchain applications that manage big data.<br>• Develop Case Study for real life scenario in the Industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 571 | IFHE232 | Higher Calculus | DSAMATH123 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 572 | IFHE232 | Human Computer Interaction | DS408 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Demonstrate an understanding of guidelines, principles, and theories influencing<br>• Recognize how a computer system may be modified to include human diversity.<br>• Select an effective style for a specific application, design mock ups and carry out user and expert evaluation of interfaces.<br>• Carry out the steps of experimental design, usability and experimental testing, and evaluation of human computer interaction systems.<br>• Use the information sources available, and be aware of the methodologies and Technologies supporting advances in HCI<br>• Understand the Industry oriented projects through Case Study | • Design, implement and evaluate effective and usable graphical computer interfaces.<br>• Describe and apply core theories, models and methodologies from the field of HCI.<br>• Describe and discuss current research in the field of HCI.<br>• Implement simple graphical user interfaces using the Java Swing toolkit.<br>• Describe special considerations in designing user interfaces for older adults.<br>• Develop Various Case Studies in the Industry | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 573 | IFHE232 | Internet of Things | DS411 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Smart Lighting, Smart Appliances, Intrusion Detection, and Smoke/Gas Detectors. Cities-Smart Parking, Smart Lighting, Smart Roads, Structural Health Monitoring, Surveillance, Emergency Response.<br>• Environment-Weather Monitoring, Air Pollution Monitoring, Noise Pollution Monitoring, Forest Fire Detection, River Floods Detection.<br>• Energy- Smart Grids, Renewable Energy Systems, Prognostics.<br>• Retail-Inventory Management, Smart Payments, Smart Vending Machines, Logistics-Route Generation & Scheduling, Fleet Tracking, Shipment Monitoring.<br>• Remote Vehicle Diagnostics, Agriculture-Smart Irrigation ,GreenHouse Control , Industry –Machine Diagnosis & Prognosis Indoor Air Quality Monitoring ,Health & Lifestyle –Health & Fitness Monitoring, Wearable Electronics. | • Understand the building blocks of IoT technology and explore the vast spectrum of IoT applications.<br>• Use processors & peripherals to design & build IoT hardware.<br>• Assess, select and customize technologies for IoT applications.<br>• Connect the cyber world with the physical world of humans, automobiles and factories.<br>• Integrate geographically distributed devices with diverse capabilities.<br>• Design and implement IoT applications that manage big data. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 574 | IFHE232 | Internship Program I | IP 221 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 575 | IFHE232 | Internship Program II | IP401 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 576 | IFHE232 | Introduction to Data Science | DS313 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | You have a strong desire to learn data science through top-quality instruction, a basic understanding of data analysis techniques and an interest in improving their ability to tackle data-rich problems in a systematic, principled way. This course provides structure and accountability to ensure you stay on track, finish strong, and achieve your desired outcomes. | Upon successful completion of the course, student will be able to:<br>CO1 Summarize the data using visual & summary analytics and common probability distributions<br>CO2 Make inference about a sample & population using hypothesis test.<br>CO3 Fit, interpret, and assess regression models and classification with one or more predictors.<br>CO4 Able to implement distinct algorithms in R or Python. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 577 | IFHE232 | Linear Algebra | DSAMATH113 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 578 | IFHE232 | Machine Learning | DS321 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To be able to formulate machine learning problems corresponding to different applications.<br>• To understand a range of machine learning algorithms along with their strengths and weaknesses.<br>• To understand the basic theory underlying machine learning.<br>• To be able to apply machine learning algorithms to solve problems of moderate complexity.<br>• To be able to read current research papers and understands the issues raised by current research<br>• To be able to implement machine learning algorithms and retrieve the required data | • Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.<br>• Have an understanding of the strengths and weaknesses of many popular machine learning approaches.<br>• Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.<br>• Be able to design and implement various machine learning algorithms in a range of real-world applications.<br>• Can implement machine learning algorithms and retrieve the required data. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 579 | IFHE232 | Natural Language Processing | DS406 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To teach students the leading trends and systems in natural language processing.<br>• To understand the concepts of morphology, syntax, semantics and pragmatics of the language and that they are able to give the appropriate examples that will illustrate the above mentioned concepts.<br>• Teach them to recognize the significance of pragmatics for natural language understanding using real time case studies.<br>• Enable students to be capable to describe the application based on natural language processing and to show the points of syntactic, semantic and pragmatic processing. | • Understand approaches to syntax and semantics in NLP.<br>• Understand approaches to discourse, generation, dialogue and summarization within NLP.<br>• Understand current methods for statistical approaches to machine translation.<br>• Provide the student with knowledge of various levels of analysis involved in NLP.<br>• Understand the applications of NLP.<br>• Gain knowledge in automated Natural Language Generation and Machine Translation.<br>• Understand the mathematical and linguistic foundations underlying approaches to the above areas in NLP<br>• Understand the underlying concepts of Autocorrect and Autocomplete, Language Translator, Social Media Monitoring, Chabot, Survey Analysis, Targeted Advertising, Voice Assistants, Grammar Checkers and Email Filtering. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 580 | IFHE232 | Neural Networks & Fuzzy Logic | DS324 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To impact knowledge on fuzzy logic principles<br>• To understand models of ANN<br>• To use the fuzzy logic and neural network for application related to design and manufacture | • To Expose the students to the concepts of feed forward neural networks<br>• To provide adequate knowledge about feedback networks.<br>• To teach about the concept of fuzziness involved in various systems and to provide adequate knowledge about fuzzy set theory.<br>• To provide comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.<br>• To provide adequate knowledge of application of fuzzy logic control to real time systems. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 581 | IFHE232 | Numerical Methods | DSAAO311 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 582 | IFHE232 | Operating Systems | CS312 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To provide a clear understanding of the concepts that underlie operating systems.<br>• To discuss Process Management and Concurrency control.<br>• To discuss memory management and virtual memory techniques.<br>• To introduce the practical aspects that pertain to the most popular operating systems such as Unix/Linux and Windows.<br>• To improve the programming skills of the students by implementing various operating system principles using C/C++/Java/Python. | • Gain extensive knowledge on principles and difference between different types of modern operating systems, virtual machines and their structure of implementation.<br>• Understand process management, concurrent processes and threads<br>• Compare performance of processor scheduling algorithms.<br>• Able to understand the concepts of deadlock in operating systems and how they can be managed / avoided and implement them in a multiprogramming system.<br>• Produce algorithmic solutions to process synchronization problems.<br>• understand the types of I/O management; disk scheduling, protection and security problems faced by operating systems and how to minimize these problems<br>• Improve their programming skills by implementing various Operating System concepts. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 583 | IFHE232 | Optimization Techniques | DSAAO225 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 584 | IFHE232 | Physics II | DSAPHY124 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 585 | IFHE232 | Physics I | DSAPHY114 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 586 | IFHE232 | Predictive Analytics | DS401 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Gain understanding of the computational foundations in Big Data Science.<br>• Develop critical inferential thinking.<br>• Gather a tool chest of R libraries for managing and interrogating raw and derived, observed, experimental, and simulated big healthcare datasets.<br>• Possess practical skills for handling complex datasets. | • Experiment with various techniques of predictive analytics and work on missing Data.<br>• Identify suitable data models for Logistic Regression.<br>• Compare regression and segmentation using Sigmoidal function.<br>• Build decision trees for classification and prune for accuracy.<br>• Analyze integrated processes for univariate stationary and non- stationary data.<br>• Define purpose, scope and format of project documentation.<br>• Can predict the data/information from the dataset using machine learning algorithms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 587 | IFHE232 | Principles of Economics | DSAECON214 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 588 | IFHE232 | Principles of Management | DSAMGTS224 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 589 | IFHE232 | Probability and Statistics | DSAAO122 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 590 | IFHE232 | Professional Communication | DSATA223 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 591 | IFHE232 | Real Time Analytics | DS405 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To know how to understand the social media data like Facebook, Twitter and YouTube.<br>• To understand how to extract and analyze the social media data using real time case studies.<br>• To learn various text mining techniques<br>• To design and understand the different visualization tools and techniques | • Summarize and analyze the social media data<br>• Make inference about emotion and sentiment analysis from social media data that will create employability opportunities for the diverse stakeholder groups.<br>• Fit, interpret, and assess models with one or more predictors<br>• Visualize the data gathered from various social media | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 592 | IFHE232 | Scientific Measurements | DSATA125 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 593 | IFHE232 | Security & Privacy in Cloud Computing | DS412 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • Cloud computing security escalates in importance and evolves, it is important that enterprises understand how to best handle the paradigm change in business operations that the cloud presents.<br>• Introduces privacy aspects to consider within the context of cloud computing, and analyzes the similarities and differences with traditional computing models.<br>• To highlight legal and regulatory implications related to privacy in the cloud.<br>• Understand the Industry oriented projects through Case Study | • To understand the concept of cloud computing and the evolution of computing into cloud computing.<br>• Able to understand infrastructure security refers to the established security capabilities at the network.<br>• Able to understand the current state of data security and the storage of data in the cloud, including aspects of confidentiality, integrity, and availability.<br>• To gain indepth knowledge of audit and compliance functions within the cloud, and the various standards and frameworks.<br>• To Develop Various Case Studies in the Industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 594 | IFHE232 | Soft Computing | DS407 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To provide an introduction to the basic principles, techniques, and applications of soft computing.<br>• Provide the mathematical background for carrying out the optimization associated with neural network learning and Particle Swarm Optimization.<br>• To develop some familiarity with current research problems in Soft Computing by working on research projects.<br>• Few Case studies were carried out on GeneticAlgorithms,Artificial Neural Networks and Particle Swarm Optimization. | • Describe Fuzzy logic and its applications.<br>• Analyze artificial neural networks and its applications.<br>• Analyze Particle Swam Optimization and its applications<br>• Solve single-objective optimization problem's using GAs.<br>• Solve multi-objective optimization problems using Evolutionary algorithms (MOEAs).<br>• Apply Soft computing techniques to solve problems in varieties of application domains.<br>• To meet the industry needs with help of a few case studies discussed and practiced technologies. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD *

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 595 | IFHE232 | Structure & Properties of Materials | DSAES226 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 596 | IFHE232 | System for Data Analytics | DS402 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To understand the various aspects of the computational infrastructure used for processing big data<br>• To understand the different types of computer architectures and how they influence the processing of data. The manner in which task parallelism and data parallelism interact with data processing<br>• To understand distributed and parallel database systems<br>• To understand the various processing frameworks, like batch processing, map-reduce, and stream processing<br>• To understand the fundamentals of cloud computing from the point of view of processing frameworks<br>• To become with platforms like AWS and Azure | • The student will have an appreciation of the various architectures used for data processing<br>• The student will understand the overall system architecture for data processing, and will be able to understand popular cloud platforms used for data processing in terms of their architecture | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 597 | IFHE232 | Technology Innovation Project | TIP 491 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 598 | IFHE232 | Thermodynamics | DSAES121 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 599 | IFHE232 | Thesis & Seminar | TS401 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 600 | IFHE232 | Workshop Practice | DSATA126 | B.Tech in Data Science & Artificial Intelligence | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 601 | IFHE233 | Advanced Power Electronics | EE408 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To learn the role of Power Electronics in utility-related applications<br>• To learn basic concepts of soft-switching and their applications | • Recognize different control techniques and design of compensators, controllers and observers<br>• Model and analyze various closed loop controllers<br>• Design controllers for different rectifiers and to analyze various modes of operation<br>• Develops the skill to model and design of various controllers for BLDC and Reluctance motors | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 602 | IFHE233 | Analog Electronics | EE321 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To design the circuits using operational amplifiers for various applications.<br>• To analyze and design amplifiers, active filters using Op-amp.<br>• To develop skills required for designing and testing integrated circuits<br>• To apply the gain-bandwidth concept and frequency response of the three basic amplifiers.<br>• To design the combinational logic circuits for different applications. | • Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.<br>• Elucidate and design the linear and nonlinear applications of an OP-Amp and special application ICs.<br>• Illustrate the function of application specific ICs such as Timers, PLL and its application in communication Field.<br>• The lab activity makes the student skill development in Op-amp based circuit designing.<br>• The project makes the student to get a job in the manufacturing circuits. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 603 | IFHE233 | Chemistry | EECHEM 111 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | · To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 604 | IFHE233 | Complex Variables | EEMATH215 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 605 | IFHE233 | Computer Programming I | EETA116 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures — lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 606 | IFHE233 | Computer Programming II | EETA127 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 607 | IFHE233 | Control Systems | EEAO312 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 608 | IFHE233 | Data Structures | EE221 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To understand the basics of all data structures.<br>• To choose the appropriate data structure for specific application.<br>• To understand and analyze various searching and sorting algorithms.<br>• To solve the complex problem using hashing, trees and graph. | • Understand how to use data structure concepts for realistic problems.<br>• Ability to identify appropriate data structure for solving computing problems in respective language.<br>• Ability to solve problems independently and think critically. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 609 | IFHE233 | Differential Equations & Fourier Series | EEMATH216 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 610 | IFHE233 | Digital Control Systems | EE404 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To enhance the knowledge of modeling and design of Digital control systems.<br>• To emphasis on using control system design tools for analysis of controlled system during its discrete-time implementation. | • Understand the fundamental differences between continuous time control and digital control.<br>• Gain in-depth knowledge and critical understanding of the theory and principles of digital control systems and their applications<br>• Distinguish the specific characteristics and differences of discrete/digital, hybrid and analog systems.<br>• Transform an analog system to discrete and vice versa<br>• Analyze the behavior of a discrete system in time domain and in frequency domain<br>• Develops the skill to design and synthesize controllers that will be implemented using digital hardware. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 611 | IFHE233 | Digital Electronics | EEES212 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 612 | IFHE233 | Digital Signal Processing | EE324 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To provide a framework for the filter design aspects of digital signal processing.<br>• To develop the design methodology of digital FIR & IIR filters.<br>• To learn thesampling rate conversions and its applications to multirate digital signal processing. | • Analyze discrete-time systems in both time & transform domain and also through pole-zero placement.<br>• Analyze discrete-time signals and systems using DFT and FFT.<br>• Design and implement digital finite impulse response (FIR) filters and digital infinite impulse response (IIR) filters.<br>• Understand and develop multirate digital signal processing systems.<br>• The software used for lab activity make them to get a job in research and simulation sector of any manufacturing industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 613 | IFHE233 | Electrical Machine Design | EE417 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To make the student learn analytical design analysis of electrical machines<br>• To understand the step by step procedure for the complete design of electrical machines. | • Develops the skill to understand the design of main dimensions and other major part of the transformer and DC and AC rotating machines.<br>• Capable of evaluating the procedure for the design of main dimensions and other major part of the transformer and DC and AC rotating machines.<br>• Equipped to apply in-depth knowledge related to the design of electrical machines. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 614 | IFHE233 | Electrical Sciences I | EEES211 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 615 | IFHE233 | Electrical Sciences II | EEES221 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 616 | IFHE233 | Electro Mechanical Energy Conversion | EE312 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To understand the working of direct and alternating current electric machines as evolved from concepts on DC and AC systems and electromagnetic.<br>• To help student develop basic concepts of Induction and synchronous machines.<br>• To equip student with knowledge to analyze the speed control mechanism and operations of Induction and synchronous machines. | • Analyze and analytically solve the single phase and three phase AC circuits<br>• Formulate and calculate the rating of capacitor for power factor improvement<br>• Explain working of Transformer and its areas of application.<br>• Develop and perform mathematical analysis of Electrical equivalent of transformer<br>• Analyze working principle of DC motor and Generator.<br>• Can perform speed control of DC motor using starter<br>• Develop and analyze mathematical model of 3 phase induction motor.<br>• Explain synchronous generator working principle and its applications | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 617 | IFHE233 | Electromagnetic Fields & Waves | EE313 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To provide the knowledge and skills required to understand, Electromagnetic waves and propagation of them<br>• To enable the student to study the wave propagation through transmission structures such as transmission lines and Wave guides.<br>• To motivate the student to identify, formulate and solve fields and electromagnetic waves propagation problems in complex media. | Course Learning Objectives<br><br>To provide the knowledge and skills required to understand, Electromagnetic waves and propagation of them<br>To enable the student to study the wave propagation through transmission structures such as transmission lines and Wave guides.<br>To motivate the student to identify, formulate and solve fields and electromagnetic waves propagation problems in complex media. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 618 | IFHE233 | Engineering Graphics | EETA115 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 619 | IFHE233 | Engineering Measurements | EETA222 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | · Describe and make calculations of plane electromagnetic waves in homogeneous media,including reflection of such waves in plane boundaries between homogeneous media. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 620 | IFHE233 | Engineering Mechanics | EEES213 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | · Analyze the nature of electromagnetic wave propagation in guided medium which are used in microwave applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 621 | IFHE233 | English Language Skills | EEEGL112 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | Develop the designing skills on transmission lines for microwave signals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 622 | IFHE233 | Environmental Science | EEEVS117 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 623 | IFHE233 | Fault Tolerant Control System | EE423 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To acquire the basic knowledge about fault identification<br>• To understand the basic concepts of Fault identification<br>• To learn about the implementation of FDI<br>• To appreciate different methods of FDI<br>• To educate the students to understand the importance of fault tolerant control systems | • Would be able understand the basic concepts of Fault identification<br>• Would be able to learn about the implementation of FDI<br>• Would be able to appreciate different methods of FDI | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 624 | IFHE233 | Flexible AC Transmission System | EE409 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To understand basic concepts, principles and operation of fast high power electronic controllers known as Flexible AC Transmission Systems (FACTS). | • Analyze the application of various power electronics based FACTS devices for the control of active and reactive power in the system<br>• Understand the control schemes of various FACTS devices<br>• Analyze passive and active Reactive Power Compensation Schemes at Transmission and Distribution level in Power Systems<br>• Digital simulation and case study of various FACTS controllers.<br>• Develops the skill to design and analyze Custom power devices for power quality improvement. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 625 | IFHE233 | High Voltage Engineering | EE412 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To make the students understand and gain knowledge of high voltage engineering | • Design the insulation of HV power equipment.<br>• Estimate electric field intensity of different electrode configurations.<br>• Understand the testing methods of high voltage equipment<br>• Understand the Breakdown mechanism of Gas, Liquid and solid insulation | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 626 | IFHE233 | Higher Calculus | EEMATH123 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 627 | IFHE233 | HVDC Transmission | EE410 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | · To understand and analyze the HVDC transmission systems | • Distinguish between the usage of EHVAC and HVDC transmission systems<br>• Judge when and where to use EHAV / HVDC transmission systems in practice<br>• Plan an appropriate electric power transmission system between two destinations to satisfy the pre-defined load requirement without compromising the technical performance<br>• Design implementation circuitry for various controllers used in HVDC transmission systems<br>• The project activity make the student suitable to get job in power generarion sectors. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 628 | IFHE233 | Hybrid Electrical Vehicles | EE424 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | Understand working of Electric Vehicles and recent trends.<br>Know-how & aptitude towards future trends in Hybrid Electric Vehicles. | • Understand mathematical models, performance and characteristics of hybrid and electric vehicles.<br>• Analyze the concepts, topologies and power flow control of electric traction systems<br>• Appraise the configuration and control of various hybrid electric motor drives<br>• Plan and design appropriate vehicle management system. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 629 | IFHE233 | Internship Program I | IP 221 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

P. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 630 | IFHE233 | Internship Program II | IP401 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 631 | IFHE233 | Linear Algebra | EEMATH113 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 632 | IFHE233 | Machine Modeling and Analysis | EE419 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | To comprehend the basic two-pole machine.<br>To identify the methods and assumptions in modeling of machines.<br>To write voltage and torque equations for different machines.<br>To recognize the different frames for modeling of different AC machines.<br>To express the voltage and torque equations in State space form | The students will be able to<br>1. Model any electrical machine given its parameters.<br>2. Perform the steady state & transient analysis of electrical machines. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 633 | IFHE233 | Micro Grids | EE422 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To understand the planning and operational issues related to Distributed Generation and Microgrids. | • Understand the current scenario of Distributed Generation and the need to implement DG sources<br>• Investigate the different types of interfaces for Grid integration of DGs.<br>• Appraise the technical impacts of DGs upon transmission and distribution systems<br>• Evaluate the various control aspects and techniques of different distributed generation sources.<br>• Associate different types of micro-grids and analyze the transients and protection related issues in micro-grids. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 634 | IFHE233 | Microcontroller & Applications | EE402 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | This course is designed to introduce the students of diverse branches to Microcon¬trollers and provide sufficient information and tools to develop and debug microcontroller based applications. In addition to establishing a foundation of assembly language pro¬gramming, a comprehensive treatment of Microcontroller interfacing will also be provided. With this background the students should be able to explore the design and interfacing of Microcontroller-based embedded systems, after finishing this course. | • Identify and evaluate the properties of Microprocessors & Microcontrollers.<br>• Analyze data transfer through serial & parallel ports.<br>• Use their practical knowledge through laboratory experiments.<br>• Design, simulate and analyze a Microcontroller-based application<br>• Lab activity and project make the student suitable to become an entrepreneur. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 635 | IFHE233 | Microelectronic Circuits | EE314 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To develop the student with the principles, operation and applications of the analog building blocks like diodes, BJT, FET for performing various functions.<br>• To learn the qualitative analysis using models, equations to illustrate the concepts and to gain the knowledge of existing analog circuits.<br>• To understand the working and analysis of amplifiers, feedback amplifiers and oscillators. | • Designing circuits using multistage amplifiers for various applications.<br>• Analyzing and design of amplifiers using negative feedback and positive feedback<br>• Develop the capability to analyze and design simple circuits containing non-linear elements such as transistors using the concepts of load lines, operating points and incremental analysis<br>• Gain insight into the behavior of a physical system driven near resonance, in particular the relationship to the transient response and the significance of the quality factor Q<br>• The lab activity of this course make the student fit to get a job in electronic circuit design era. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 636 | IFHE233 | Microprocessor Programming & Interfacing | EE311 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • This subject deals about the basics of 8-bit and 16-bit Microprocessor, their architectures, internal organization and their functions, peripherals and interfacing.<br>• The objective of the course is to enable the students to acquire Assembly language programming skill which is the real essence of Microprocessor.<br>• The student can learn how a microprocessor is interfaced with wide variety of low-level I/O devices. | • Recall and apply the basic concept of digital fundamentals to Microprocessorbased personal computer system.<br>• Identify the detailed s/w & h/w structure of the Microprocessor.<br>• Illustrate how the different peripherals are interfaced with Microprocessor.<br>• Train their practical knowledge through laboratory experiments.<br>• Analyze the data transfer information through serial & parallel ports. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 637 | IFHE233 | Numerical Methods | EEAO311 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |
| 638 | IFHE233 | Optimization Techniques | EEAO225 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 639 | IFHE233 | Physics II | EEPHY124 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 640 | IFHE233 | Physics I | EEPHY114 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 641 | IFHE233 | Power Electronics | EE323 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | 1. Relate basic semiconductor physics to properties of power devices, and combine circuit mathematics and characteristics of linear and non-linear devices. 3. Design and Analyze power converter circuits and learn to select suitable power electronic devices by assessing the requirements of application fields | Course Learning Objectives:<br>To learn Power semiconductor devices, various important topologies of power converter circuits for specific types of applications.<br>To equip students with an ability to understand and analyze non-linear circuits involving power electronic converters. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 642 | IFHE233 | Power Electronics Application and Drives | EE407 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To understand the basic concept of DC and AC Drives<br>• To understand the various control techniques involved with both DC and AC Drives<br>• To brief about the working principle of Special Electrical Drives | • Gain fundamental concepts of power electronic converter fed DC and AC machines.<br>• Analyze the converter fed motor under different torque/speed conditions.<br>• Design converter fed drives with existing/new control techniques | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 643 | IFHE233 | Power Generation Systems | EE414 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To understand the working of different types of power generation systems<br>• To realize the necessity for interconnected operation of different power stations | • Appreciate the different types of tariff, consumers and different types of power generation plants.<br>• Determine the significance of various components of the power generation plants.<br>• Correlate the importance of interconnected operation of different power generation systems.<br>• Plan an appropriate scheduling of electric power to satisfy the demand constraint. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 644 | IFHE233 | Power Quality | EE413 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To know different terms of power quality.<br>• To Illustrate of voltage power quality issue – short and long interruption<br>• To construct study of characterization of voltage sag magnitude and three phase unbalanced voltage sag.<br>• To know the behavior of power electronics loads; induction motors, synchronous motor etc by the power quality issues<br>• To prepare mitigation of power quality issues by the VSI converters. | • Know the severity of power quality problems in distribution system;<br>• Understand the concept of voltage sag transformation from up-stream (higher voltages) to down-stream (lower voltage);<br>• Develops the skill to compute the concept of improving the power quality to sensitive load by various mitigating custom power devices. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 645 | IFHE233 | Power System Analysis | EE415 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To model various power system components and carry out load flow, short circuit and stability studies.<br>• To determine the stability of power system.<br>• To Analyze economic operation and load frequency control of power system | • Carry out load flow study of a practical system<br>• Simulate and analyze fault<br>• Study the stability of power systems | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 646 | IFHE233 | Power System Controls and Stability | EE405 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To develop the over-view of the power system operation<br>• To understand various controls working in power system to ensure its reliable operation<br>• To analyze power system stability under both steady state and transient conditions<br>• To apply stability determining criterion like equal area methods under different fault conditions<br>• To learn dynamic model of synchronous machine | CO1: Knowledge of various controls working in power systems ensuring reliable operation<br>CO2: Knowledge of various power dispatch techniques used in economic load scheduling<br>CO3: Knowledge of mathematical tools for analyzing stability of power systems | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 647 | IFHE233 | Power System Transients | EE411 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To understand different types switching transients in power systems and their control using circuits<br>• To study Lightning phenomena and the production of lighting surges.<br>• To understand Travelling waves in distributed parameter multi-conductor lines, Simulation of surge diverters in transient analysis<br>• To study the impact of voltage transients caused by faults, circuit breaker action, load rejection on integrated power system | Course Learning Objectives<br><br>To understand different types switching transients in power systems and their control using circuits<br>To study Lightning phenomena and the production of lighting surges.<br>To understand Travelling waves in distributed parameter multi-conductor lines, Simulation of surge diverters in transient analysis<br>To study the impact of voltage transients caused by faults, circuit breaker action, load rejection on integrated power system | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 648 | IFHE233 | Power Systems | EE322 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To learn major elements of power transmission and distribution systems.<br>• To learn the principle of operation of transmission and distribution of power over long transmission lines.<br>• To learn and appreciate the key factors in transmission and distribution of power and network design. | Course Learning Objectives:<br>To learn major elements of power transmission and distribution systems.<br>To learn the principle of operation of transmission and distribution of power over long transmission lines.<br>To learn and appreciate the key factors in transmission and distribution of power and network design. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 649 | IFHE233 | Principles of Economics | EEECON214 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 650 | IFHE233 | Principles of Management | EEMGTS224 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION (Deemed-to-be University Under Section 3 of the UGC Act, 1956) HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 651 | IFHE233 | Probability and Statistics | EEAO122 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 652 | IFHE233 | Process Control | EE403 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To learn basics of process control and the instrumentation used for it.<br>• To know concepts, and mathematical modeling and its use for control purposes.<br>• To go deeper into the design of feedback controllers. A special emphasis will be placed on the controller tuning and stability analysis.<br>• To learn several advanced control systems under the process control | Course Learning Objectives<br><br>To learn basics of process control and the instrumentation used for it.<br>To knowconcepts, and mathematical modeling and its use for control purposes.<br>To go deeper into the design of feedback controllers. A special emphasis will be placed on the controller tuning and stability analysis.<br>To learn several advanced control systems under the process control | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 653 | IFHE233 | Professional Communication | EETA223 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | · To model details and intricacies of different stages of process control | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 654 | IFHE233 | Scientific Measurements | EETA125 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | · Describe and make calculations of plane electromagnetic waves in homogeneous media,including reflection of such waves in plane boundaries between homogeneous media. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 655 | IFHE233 | Signals & Systems | EE211 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | 1) Analyze the discrete time signals and system using different transform domain techniques. 2) Design and implement LTI filters for filtering different real world signals. 3) Develop different signal processing applications using DSP processor. | Upon successful completion of the course, student will be able to:<br>CO1 : Apply the knowledge of linear algebra topics like vector space, basis, dimension, inner product, norm and orthogonal basis of signals.<br>CO2: Analyze the spectral characteristics of continuous-time periodic and aperiodic signals using Fourier analysis.<br>CO3: Classify systems based on their properties and determine the response of LSI system using convolution.<br>CO4: The software used for the lab activity develops the skill to classify the signals in the telecommunication era.<br>CO5:The lab and project activity develops the signal processing knowledge to catch the job in telecommunication era. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 656 | IFHE233 | Smart Grids | EE421 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To understand the need and concept of Smart Grid.<br>• To study different EMS and DMS functions and smart meters.<br>• To get familiarized with the communication networks for Smart Grid applications | • Get acquainted with the smart resources, smart meters and other smart devices.<br>• Describe how modern power distribution system functions.<br>• Identify suitable communication networks for smart grid applications | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 657 | IFHE233 | Special Machines | EE416 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To expose the students to the construction, principle of operation and performance of special electrical machines as an extension to the study of basic electrical machines.<br>• To understand Operation and performance of variable reluctance motors, Hybrid motors, Switched reluctance motors, Permanent magnet synchronous motor | Course Learning Objectives<br>To expose the students to the construction, principle of operation and performance of special electrical machines as an extension to the study of basic electrical machines.<br>To understand Operation and performance of variable reluctance motors, Hybrid motors, Switched reluctance motors, Permanent magnet synchronous motor. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 658 | IFHE233 | Special Project | EE 491 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | This is an unstructured open ended where under the overall supervision of a faculty-in-charge, batches of students will be attached to different faculty members. Each batch will work on a specific time bound which is of basic or peripheral concern of student's discipline. Each student must submit a project report as a culmination of his endeavor and investigation. Faculty-in-charge will determine the choice of the project and also whether or not the project report is to be submitted jointly by a group or individually by a student. This course will aim to evaluate the student actual ability to use the fundamentals of knowledge and to meet the new unknown situations as demonstrated by the student's interaction with the faculty member and faculty-in-charge. The faculty-in-charge may assign specific hours of formal | · To analyze and understand working principle and working of reluctance motors, Stepping motors, Switched reluctance motors, Permanent magnet brushless D.C. motors and Permanent magnet synchronous motors. | 20.00% | 35.00% | 10.00% | 00% | 000% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 659 | IFHE233 | Stochastic Control Systems | EE401 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To equip students with fundamentals of uncertainties, randomness and noise in engineering systems<br>• To equip students with knowledge of tools and techniques from probability theory and systems theory<br>• To equip students with knowledge of stochastic control theory for their research | · Upon completion of this subject student able to start design of special machines and become entrepreneur. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 660 | IFHE233 | Structure & Properties of Materials | EEES226 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 661 | IFHE233 | Switchgear & Protection | EE425 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To learn various protective schemes for electrical apparatus and power systems<br>• To learn different type of circuit breakers and relays used for the protection of generators, transformers and bus bars from different types of faults that occur in power system operation | • Understand the construction, function, principle and applications of fuses, circuit breaker and current limiting reactors<br>• Understand sources and phenomenal effects of over voltages in power system network<br>• Understand various protection schemes against different kinds of faults and their theories<br>• Gain a clear knowledge of various protection schemes against different kinds of faults and their theories | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 662 | IFHE233 | Technology Innovation Project | TIP 491 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 663 | IFHE233 | Thermodynamics | EEES121 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 664 | IFHE233 | Thesis & Seminar | TS401 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 665 | IFHE233 | Utilization of Electrical Energy | EE418 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To introduce fundamental concepts of utilization of electrical energy which emphasis on types of Electrical Drives, Electrical heating, Illumination and Electrical Traction<br>• To provide students with the skills to understand the analytical methods related to illumination design, Electrical heating, Electrical traction and Electrical drives. | • Select the proper motor for practical applications. They acquire the knowledge of electrical drives, types of motors used in Industries, types of loads and load equalization.<br>• Understand illumination and its related terms, laws. They get familiar about photometry integrated sphere and designing of lightning schemes like flood lightning, street lightning etc.<br>• Know different types of electrical heating like resistance, induction and dielectric heating<br>• Get familiar with practical implementation of electrical heating<br>• Know special features of traction motors, types of electrical traction systems in India.<br>• Know mechanics of traction analysis of speed time curves specific energy consumption. . | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 666 | IFHE233 | Vehicular Electric Power System | EE406 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | • To make the student understand the fundamental concepts, principles and analysis of hybrid and electric vehicles.<br>• To understand the latest developments in power system in air craft, sea and undersea vehicles | • Understand the various aspects of hybrid and electric vehicles<br>• Plan the selection of electrical machines for hybrid and electric vehicles<br>• Select various energy storage technologies for hybrid and electric vehicles<br>• Implement energy management techniques for hybrid and electric vehicles<br>• Demonstrate the power system of various vehicular system | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 667 | IFHE233 | Workshop Practice | EETA126 | B.Tech in Electrical and Electronics Engineering | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 668 | IFHE234 | Signals & Systems | EC211 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | 1) Analyze the discrete time signals and system using different transform domain techniques. 2) Design and implement LTI filters for filtering different real world signals. 3) Develop different signal processing applications using DSP processor. | Upon successful completion of the course, student will be able to:<br>CO1 : Apply the knowledge of linear algebra topics like vector space, basis, dimension, inner product, norm and orthogonal basis of signals.<br>CO2: Analyze the spectral characteristics of continuous-time periodic and aperiodic signals using Fourier analysis.<br>CO3: Classify systems based on their properties and determine the response of LSI system using convolution.<br>CO4: The software used for the lab activity develops the skill to classify the signals in the telecommunication era.<br>CO5:The lab and project activity develops the signal processing knowledge to catch the job in telecommunication era. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 669 | IFHE234 | Advanced Power Electronics | EE407 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To learn the role of Power Electronics in utility-related applications<br>• To learn basic concepts of soft-switching and their applications | • Recognize different control techniques and design of compensators, controllers and observers<br>• Model and analyze various closed loop controllers<br>• Design controllers for different rectifiers and to analyze various modes of operation<br>• Develops the skill to model and design of various controllers for BLDC and Reluctance motors | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 670 | IFHE234 | Analog & Digital VLSI Design | EC 322 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | To provide in-depth understanding of the analog integrated circuit and building blocks<br>To provide a basic idea on mixed signal IC design | Upon successful completion of the course, the students will be able to:<br>CO1 Classify ICs, static and dynamic VLSI design techniques.<br>CO2 Design any CMOS digital VLSI combinatorial and sequential circuits.<br>CO3 Design, analyze and verify digital logic circuits and MOS memories as well as Physical layout designing of circuits.<br>CO4 Model the CMOS circuits with equivalent parameters.<br>CO5 Attain the skill development in designing layout and ALU designs | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 671 | IFHE234 | Analog Electronic | EC 321 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To design the circuits using operational amplifiers for various applications.<br>• To analyze and design amplifiers, active filters using Op-amp.<br>• To develop skills required for designing and testing integrated circuits<br>• To apply the gain-bandwidth concept and frequency response of the three basic amplifiers.<br>• To design the combinational logic circuits for different applications. | • Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.<br>• Elucidate and design the linear and nonlinear applications of an OP-Amp and special application ICs.<br>• Illustrate the function of application specific ICs such as Timers, PLL and its application in communication Field.<br>• The lab activity makes the student skill development in Op-amp based circuit designing.<br>• The project makes the student to get a job in the manufacturing circuits. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 672 | IFHE234 | Antenna and wave propagation | EC407 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand the basic mechanism of radiation by antenna elements.<br>• To understand the various practical antennas and analyze their performance parameters<br>• To analyze, design an antenna for wireless communications. | • Select the appropriate portion of electromagnetic theory and its application to antennas.<br>• Assess the need for antenna arrays and mathematically analyze the types of antenna arrays.<br>• Distinguish primary antennas from secondary antennas and analyze their characteristics by applying optics and acoustics principles.<br>• Outline the factors involved in the propagation of radio waves using practical antennas.<br>• Developes the skill to distinguish the receiving antennas from transmitting antennas, analyze and justify their characteristics | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 673 | IFHE234 | Chemistry | ECCHEM 111 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 674 | IFHE234 | CMOS Analog Integrated Circuit Design | EC413 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | This course builds the basic concepts and the design of advanced CMOS analog Integrated Circuit. The course is intended to teach undergraduate and graduate students. This course focuses on the concepts of MOSFETs and design of amplifiers including non-linear effects. The course will give practical aspect of CMOS analog IC design | Upon successful completion of the course, the students will be able to:<br>CO1 To recall and identify the CMOS VLSI, design of CMOS logic circuits, switches and memory<br>CO2 To design CMOS logic circuits, CMOS Amplifiers<br>CO3 To apply CMOS Operational Amplifiers for meeting current and future VLSI challenges faced by the organization.<br>CO4 To compare the Comparators<br>CO5 To generalize the design techniques and analyze the characteristics of CMOS VLSI circuits<br>CO6 To enable the students develop the skill set CMOS circuit design | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 675 | IFHE234 | Communication Systems | EC 312 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | The basic objective of this course is to provide basic knowledge of major components of a communication system. It will help students understand the basics of signal and representation of signals by trigonometric Fourier series, signal transmission and analysis, Fourier transforms and their properties. It will enhance students' knowledge about random noise processes. It will give them a detailed knowledge of modulation ad demodulation, analogue modulation techniques, carrier recovery schemes and phase-locked loops (PLLs). It will provide the knowledge of sampling theorem and reconstruction of signals. Also an introduction to information theory, source coding, channel capacity, and communication channel models shall be discussed. | CO1: Understand the principles of AM and FM.<br>CO2: Develop a prototype of Amateur Radio.<br>CO3: Evaluate the performance of a communication systems in terms of Noise.<br>CO4: Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.<br>CO5: Perform the time and frequency domain analysis of the signals in a digital communication system.<br>CO6: Understand various coding schemes that are used in digital communication system<br>CO7: The hardware-oriented lab activity develops the skill in finding the appropriate modulation techniques for signal processing. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 676 | IFHE234 | Complex Variables | ECMATH215 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 677 | IFHE234 | Computer Programming I | ECTA116 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures –- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 678 | IFHE234 | Computer Programming II | ECTA127 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 679 | IFHE234 | Control Systems | ECAO312 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 680 | IFHE234 | Data Compression & Encryption | EC424 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand the fundamentals of data compression, data encryption and network security.<br>• To analyze the real time encryption and security methods | • Implement text, audio and video compression techniques.<br>• Understand symmetric and asymmetric key cryptography schemes<br>• Understand network security and ethical hacking<br>• The project activity of this make the student suitable to a get job in app design software companies. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 681 | IFHE234 | Data Structures | EC221 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand the basics of all data structures.<br>• To choose the appropriate data structure for specific application.<br>• To understand and analyze various searching and sorting algorithms.<br>• To solve the complex problem using hashing, trees and graph. | • Understand how to use data structure concepts for realistic problems.<br>• Ability to identify appropriate data structure for solving computing problems in respective language.<br>• Ability to solve problems independently and think critically. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 682 | IFHE234 | Differential Equations & Fourier Series | ECMATH216 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. V. Jayalal
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 683 | IFHE234 | Digital Control Systems | EE403 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To enhance the knowledge of modeling and design of Digital control systems.<br>• To emphasis on using control system design tools for analysis of controlled system during its discrete-time implementation. | • Understand the fundamental differences between continuous time control and digital control.<br>• Gain in-depth knowledge and critical understanding of the theory and principles of digital control systems and their applications<br>• Distinguish the specific characteristics and differences of discrete/digital, hybrid and analog systems.<br>• Transform an analog system to discrete and vice versa<br>• Analyze the behavior of a discrete system in time domain and in frequency domain<br>• Develops the skill to design and synthesize controllers that will be implemented using digital hardware. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 684 | IFHE234 | Digital Design Using HDLS | EC412 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | To design the digital circuits, behavior and RTL modeling of digital circuits using Verilog HDL, verifying the models and synthesizing RTL models to standard cell libraries and FPGAs, students will have practical experience by designing, modeling, implementing and verifying several digital circuits, the different technologies related to HDLs, construct, compile and execute Verilog HDL programs, the digital components and circuits that are testable, reusable, and synthesizable. | • Develop the skills to describe implementable code for digital circuits using Verilog hardware description languages (HDL) using all its constructs, Know the difference between synthesizable and non-synthesizable code. Understand many digital circuits practically.<br>• Develop the skills of designing any application digital systems such as advanced counters, state machine based systems.<br>• Attain the ability of analyzing the digital system in terms of various styles of Verilog HDL based digital design and understand the difference of pros and cons of each style.<br>• Able to synthesize and implement any sequential and combinational digital system.<br>• The softwarebased teaching make the student fir to gat a job in designing and simulation era. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 685 | IFHE234 | Digital Electronics | ECES212 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 686 | IFHE234 | Digital Signal Processing | EC 324 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To provide a framework for the filter design aspects of digital signal processing.<br>• To develop the design methodology of digital FIR & IIR filters.<br>• To learn thesampling rate conversions and its applications to multirate digital signal processing. | • Analyze discrete-time systems in both time & transform domain and also through pole-zero placement.<br>• Analyze discrete-time signals and systems using DFT and FFT.<br>• Design and implement digital finite impulse response (FIR) filters and digital infinite impulse response (IIR) filters.<br>• Understand and develop multirate digital signal processing systems.<br>• The software used for lab activity make them to get a job in research and simulation sector of any manufacturing industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION
HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 687 | IFHE234 | Digital Systems | EC415 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | The objective of the course is to develop the ability to analyze and design digital systems. It aims at through understanding of combinational and sequential digital circuits design with timing constraints. | "CO1: Develops the skill to describe how analog signals are used to represent digital values in different logic families, including characterization of the noise margins. Evaluate combinational and sequential logic designs using various technology families and various performance metrics.<br>CO2: Attain the skill to analyze any complex combinational and sequential circuits<br>CO3: With various technology families of CPLD and FPGA families introduced can synthesize various advanced circuits<br>" | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 688 | IFHE234 | DSP Processors and Architecture | EC419 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | The book is designed for a first course in Digital Signal Processors. It blends the Digital Signal Processing theory with its applications on systems using Digital Signal Processors. | CO1: Understands the concepts of digital signal processing techniques.<br>CO2: Acquire knowledge of DSP computational building blocks and knows how to Achieve speed in DSP architecture or processor.<br>CO3: Develop basic DSP algorithms using DSP processors.<br>CO4: Acquire knowledge about various addressing modes of DSP TMS320C54XX [illegible] are able to program DSP processor. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 689 | IFHE234 | Electrical Machine Design | EE415 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To make the student learn analytical design analysis of electrical machines<br>• To understand the step by step procedure for the complete design of electrical machines. | · Understand and develop multirate digital signal processing systems. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 690 | IFHE234 | Electrical Sciences I | ECES211 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | · The software used for lab activity make them to get a job in research and simulation sector of any manufacturing industry. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 691 | IFHE234 | Electrical Sciences II | ECES221 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 692 | IFHE234 | Electromagnetic Fields & Waves | EC 313 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To provide the knowledge and skills required to understand, Electromagnetic waves and propagation of them<br>• To enable the student to study the wave propagation through transmission structures such as transmission lines and Wave guides.<br>• To motivate the student to identify, formulate and solve fields and electromagnetic waves propagation problems in complex media. | Course Learning Objectives<br><br>To provide the knowledge and skills required to understand, Electromagnetic waves and propagation of them<br>To enable the student to study the wave propagation through transmission structures such as transmission lines and Wave guides.<br>To motivate the student to identify, formulate and solve fields and electromagnetic waves propagation problems in complex media. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 693 | IFHE234 | Embedded Real Time Operating System | EC418 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | This course covers the basic concepts and principles of operating systems, showing how to apply them to the design and implementation of complete operating systems for embedded and real-time systems. It includes all the foundational and background information on ARM architecture, ARM instructions and programming. It describes the design and implementation of a complete OS for embedded systems in incremental steps, explaining the design principles and implementation techniques. For Symmetric Multiprocessing (SMP) embedded systems. | CO1: Get complete knowledge on concepts of RTOS<br>CO2: Analyze kernel objects such as memory management, process management of RTOS<br>CO3: Get practice and implement in ARM programming tools<br>CO4: Design and simulate ARM based interfaces and drivers<br>CO5: Get familiar in ARM tool chain under Ubuntu (15.10) Linux and emulated ARM virtual machines under QEMU | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 694 | IFHE234 | Embedded Systems (H/W) | EC416 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To develop the concepts of the modern embedded system concepts, embedded 16-bit and 32- bit processors | CO1:Distinguish and analyze the properties of 16bit and 32bit embedded processors.<br>CO2: Analyze the data transfer information through serial & parallel ports.<br>CO3: The project oriented syllabus make the student fit to become entrepreneur | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 695 | IFHE234 | Engineering Graphics | ECTA115 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 696 | IFHE234 | Engineering Measurements | ECTA222 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | The project oriented syllabus make the student fit to become entrepreneur. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 697 | IFHE234 | Engineering Mechanics | ECES213 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 698 | IFHE234 | English Language Skills | ECEGL112 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD *

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 699 | IFHE234 | Environmental Science | ECEVS117 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S V Jayalalitha
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700 | IFHE234 | Flexible AC Transmission System | EE408 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand basic concepts, principles and operation of fast high power electronic controllers known as Flexible AC Transmission Systems (FACTS).<br>• To understand use of FACTS devices like SVC, TCSC, STATCOM, SSSC to enhance controllability, stability and power transfer capability of AC transmission systems with fastest control speed.<br>• To understand the influence of measurement systems, network resonances and harmonic interactions on the performance of FACTS control systems<br>• To understand the interactions amongst various FACTS Controllers and techniquesfor their coordination and placement | • Analyze the application of various power electronics based FACTS devices for the control of active and reactive power in the system<br>• Understand the control schemes of various FACTS devices<br>• Analyze passive and active Reactive Power Compensation Schemes at Transmission and Distribution level in Power Systems<br>• Digital simulation and case study of various FACTS controllers.<br>• Develops the skill to design and analyze Custom power devices for power quality improvement. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 701 | IFHE234 | Hardware Software Co- Design | EC417 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | This course gives an introduction to the subject of embedded systems design, with emphasis on integration of custom hardware components with software. The key problem addressed is how can an embedded systems designer strike a balance between flexibility and efficiency? The course describes how combining hardware design with software design leads to a solution to this important computer engineering problem. | • To recall and identify the Hardware Software Co- Design Issues.<br>• To design Prototyping and Emulation<br>• To apply the Compilation Techniques for Embedded Processor Architectures.<br>• To compare the Compilation Tools for Embedded Processor Architectures<br>• To generalize the design techniques and analyze the characteristics of Co- Design Issues<br>• Use Languages for System Level Specification & Design | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 702 | IFHE234 | High Speed Communication Networks | EC402 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | In the last few years, the world of information networks has undergone significant changes that will revolutionize the future of communications. Data rates have reached the gigabit per second range. Optical fibers have become the transmission medium of choice. Standardization activities have very aggressively produced a set of well established standard for future LANs, MANs and WANs. It has become very difficult for computer and communications professionals to follow these rapidly evolving technologies and standards. This course cover all aspects of High Performance Networks: Technology and Protocols provides a timely technical overview of the start-of-the-art in high performance networking. | • recognize different levels of communication networks<br>• reproduce characteristics of high-speed network technologies<br>• apply channel models to determine transmission performances<br>• analyse signal transmission through communication channels<br>• develops the skill to create models of access networks and channels<br>• develops the skill to compute performances of multiple access to communication channels | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 703 | IFHE234 | High Voltage Engineering | EE411 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To make the students understand and gain knowledge of high voltage engineering | • Design the insulation of HV power equipment.<br>• Estimate electric field intensity of different electrode configurations.<br>• Understand the testing methods of high voltage equipment<br>• Understand the Breakdown mechanism of Gas, Liquid and solid insulation | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 704 | IFHE234 | Higher Calculus | ECMATH123 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 705 | IFHE234 | HVDC Transmission | EE409 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand and analyze the HVDC transmission systems<br>• To plan an appropriate transmission system between two destinations based on the load requirement and anticipated technical performance of power transmission | • Distinguish between the usage of EHVAC and HVDC transmission systems<br>• Judge when and where to use EHAV / HVDC transmission systems in practice<br>• Plan an appropriate electric power transmission system between two destinations to satisfy the pre-defined load requirement without compromising the technical performance<br>• Design implementation circuitry for various controllers used in HVDC transmission systems<br>• The project activity make the student suitable to get job in power generarion sectors. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 706 | IFHE234 | Image Processing | EC422 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand the basic concepts, methodologies and algorithms of digital image processing<br>• To apply the principles of image processing to various fields such as computer vision systems, biomedical image analysis, Character recognition, and multimedia processing & retrieval | • Analyze image transforms, types and their properties<br>• Explore the causes for image degradation and understand the restoration methods<br>• Evaluate the image compression techniques in spatial and frequency domain.<br>• Understand feature extraction techniques for image analysis and recognition.<br>• The lab activity and project make the student suitable to get job in research sector. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 707 | IFHE234 | Internship Program I | IP 221 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 708 | IFHE234 | Internship Program II | IP401 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 709 | IFHE234 | Linear Algebra | ECMATH113 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 710 | IFHE234 | Low power VLSI Design | EC411 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | 1. This course addresses a profound analysis on the development<br>of the CMOS & Bi-CMOS digital circuits for a low voltage low<br>power environment<br>2. To study the concepts of device behavior and modeling<br>3. To study the concepts of low voltage, low power logic circuits. | • To recall and identify the VLSI power estimation, design of CMOS logic circuits, switches and memory<br>• Probabilistic Techniques for signal activity estimation and Statistical Techniques<br>• To apply Low power VLSI techniques for meeting current and future VLSI challenges faced by the organization<br>• To generalize the design techniques and analyze the characteristics of VLSI power dissipation<br>• Synthesis for Low Power, Low Power Static RAM Architectures | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 711 | IFHE234 | Machine Modeling And Analysis | EE417 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | Course Objectives:<br><br>To comprehend the basic two-pole machine.<br>To identify the methods and assumptions in modeling of machines.<br>To write voltage and torque equations for different machines.<br>To recognize the different frames for modeling of different AC machines.<br>To express the voltage and torque equations in State space form | Course Outcomes:<br>Upon the completion of the course the student will be able to<br><br>Write the voltage equation and torque equations for different machines like dc machine, induction motor and Synchronous machines.<br><br>Model different machines using phase and Active transformations.<br>Identify the different reference frames for modeling of machines. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 712 | IFHE234 | Microcontroller & Applications | EC421 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | This course is designed to introduce the students of diverse branches to Microcon¬trollers and provide sufficient information and tools to develop and debug microcontroller based applications. In addition to establishing a foundation of assembly language pro¬gramming, a comprehensive treatment of Microcontroller interfacing will also be provided. With this background the students should be able to explore the design and interfacing of Microcontroller-based embedded systems, after finishing this course. | • Identify and evaluate the properties of Microprocessors & Microcontrollers.<br>• Analyze data transfer through serial & parallel ports.<br>• Use their practical knowledge through laboratory experiments.<br>• Design, simulate and analyze a Microcontroller-based application<br>• Lab activity and project make the student suitable to become an entrepreneur. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 713 | IFHE234 | Microelectronic Circuits | EC 314 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | To develop the student with the principles, operation and applications of the analog building blocks like diodes, BJT, FET for performing various functions. | • Designing circuits using multistage amplifiers for various applications.<br>• Analyzing and design of amplifiers using negative feedback and positive feedback<br>• Develop the capability to analyze and design simple circuits containing non-linear elements such as transistors using the concepts of load lines, operating points and incremental analysis<br>• Gain insight into the behavior of a physical system driven near resonance, in particular the relationship to the transient response and the significance of the quality factor Q<br>• The lab activity of this course make the student fit to get a job in electronic circuit design era. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 714 | IFHE234 | Microprocessor Programming & Interfacing | EC 311 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | To learn the qualitative analysis using models, equations to illustrate the concepts and to gain the knowledge of existing analog circuits. | CO1: Recall and apply the basic concept of digital fundamentals to Microprocessor based personal computer systems.<br>CO2: Identify the detailed s/w & h/w structure of the Microprocessor.<br>CO3: Illustrate how the different peripherals are interfaced with Microprocessor.<br>CO4: Train their practical knowledge through laboratory experiments and develop the basic programming skills.<br>CO5: The hardware oriented lab activity makes the student clear about the manufacturing & internal structure of the programmable IC, which takes him/her to catch a job. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 715 | IFHE234 | MIMO Wireless Communication | EC401 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | To understand the working and analysis of amplifiers, feedback amplifiers and oscillators. | Students are able to<br><br>CO1: discuss the cellular system design and technical challenges.<br><br>CO2: analyze the Mobile radio propagation, fading, diversity concepts and the channel modeling.<br><br>CO3: analyze the design parameters, link design, smart antenna, beam forming and MIMO systems.<br><br>CO4: analyze Multiuser Systems, CDMA, WCDMA network planning and OFDM Concepts.<br><br>CO5: summarize the principles and applications of wireless systems and standards | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 716 | IFHE234 | Mobile Communication | EC406 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand the basics in the field of Mobile communication.<br>• To have thorough knowledge of the recent advances in the field of Mobile communication technology. | • Understand the basics of propagation of radio signals<br>• Understand how radio signals can be used to carry digital information in a spectrally efficient manner.<br>• Understand the basic principles behind radio resource management techniques such as power control, channel allocation and handoffs.<br>• Understand communication between two mobile equipments using GSM and CDMA technology<br>• Develops the skill to gain insights into how diversity afforded by radio propagation can be exploited to improve performance | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 717 | IFHE234 | Numerical Methods | ECA0311 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 718 | IFHE234 | Optical Fiber Communications | EC404 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To develop the students in understanding the basics of signal propagation through optical fibers.<br>• To design components & devices required for the optical communication and to understand optical impairments | • Identify and understand the structures of Optical fiber and types.<br>• Understand, analyze the channel impairments like losses and dispersion,various coupling losses<br>• Classify the Optical sources and detectors and to familiar with Design considerations of fiber optic systems<br>• Able to get a job in telecommunication sector. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 719 | IFHE234 | Optimization Techniques | ECAO225 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 720 | IFHE234 | Physics II | ECPHY124 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 721 | IFHE234 | Physics I | ECPHY114 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 722 | IFHE234 | Power Electronics Applications and Drives | EE406 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand the basic concept of DC and AC Drives<br>• To understand the various control techniques involved with both DC and AC Drives<br>• To brief about the working principle of Special Electrical Drives | • Gain fundamental concepts of power electronic converter fed DC and AC machines.<br>• Analyze the converter fed motor under different torque/speed conditions.<br>• Develops the skill to design converter fed drives with existing/new control techniques | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 723 | IFHE234 | Power Generation Systems | EE413 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand the working of different types of power generation systems<br>• To realize the necessity for interconnected operation of different power stations | • Appreciate the different types of tariff, consumers and different types of power generation plants.<br>• Determine the significance of various components of the power generation plants.<br>• Correlate the importance of interconnected operation of different power generation systems.<br>• Plan an appropriate scheduling of electric power to satisfy the demand constraint. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 724 | IFHE234 | Power Quality | EE412 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To know different terms of power quality.<br>• To Illustrate of voltage power quality issue – short and long interruption<br>• To construct study of characterization of voltage sag magnitude and three phase unbalanced voltage sag.<br>• To know the behavior of power electronics loads; induction motors, synchronous motor etc by the power quality issues<br>• To prepare mitigation of power quality issues by the VSI converters. | • Know the severity of power quality problems in distribution system;<br>• Understand the concept of voltage sag transformation from up-stream (higher voltages) to down-stream (lower voltage);<br>• Compute the concept of improving the power quality to sensitive load by various mitigating custom power devices. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 725 | IFHE234 | Power system controls and stability | EE404 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To develop the over-view of the power system operation<br>• To understand various controls working in power system to ensure its reliable operation<br>• To analyze power system stability under both steady state and transient conditions<br>• To apply stability determining criterion like equal area methods under different fault conditions<br>• To learn dynamic model of synchronous machine | CO1: Knowledge of various controls working in power systems ensuring reliable operation<br>CO2: Knowledge of various power dispatch techniques used in economic load scheduling<br>CO3: Knowledge of mathematical tools for analyzing stability of power systems | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 726 | IFHE234 | Power System Transients | EE410 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To understand different types switching transients in power systems and their control using circuits<br>• To study Lightning phenomena and the production of lighting surges.<br>• To understand Travelling waves in distributed parameter multi-conductor lines, Simulation of surge diverters in transient analysis<br>• To study the impact of voltage transients caused by faults, circuit breaker action, load rejection on integrated power system | After completing this course the candidate shall:<br><br>- have a solid foundation in understanding the source and characteristics of lightning, switching, and temporary overvoltages.<br><br>- understand travelling wave propagation on transmission lines.<br><br>- understand the critical switching transient situations.<br><br>- be able to set up differential equations for RLC circuits and solve it via stationary and transient solutions.<br><br>- understand the mode of operation and dimentioning criteria for surge arresters.<br><br>- understand the physical and electrical construction of high voltage systems. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC, ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 727 | IFHE234 | Principles of Economics | ECECON214 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | The course aims to provide to the students an insight into the scientific & analytical methods, techniques and tools of economics, a precise and comprehensive coverage of fundamental concepts in economics; and give suitable examples to expose him/her to possibilities of applications of these concepts in business and economic policy. | · Can analyze the use of EMTP and EMTDC/PSCAD package, Insulation Coordination. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 728 | IFHE234 | Principles of Management | ECMGTS224 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | The course aims to provide to the students an insight into the scientific & analytical methods, techniques and tools of economics, a precise and comprehensive coverage of fundamental concepts in economics; and give suitable examples to expose him/her to possibilities of applications of these concepts in business and economic policy. | · Understand insulation coordination procedures for high voltages systems. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 729 | IFHE234 | Probability and Statistics | ECAO122 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | Develops the skill to design Lightning arrestors and surge absorbers for Power systems. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 730 | IFHE234 | Process Control | EE402 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To learn basics of process control and the instrumentation used for it.<br>• To know concepts, and mathematical modeling and its use for control purposes.<br>• To go deeper into the design of feedback controllers. A special emphasis will be placed on the controller tuning and stability analysis.<br>• To learn several advanced control systems under the process control | At the completion of this course, students will be able to:<br>• Understand the basic principles & importance of process control in industrial process plants;<br>• Specify the required instrumentation and final elements to ensure that well-tuned control is achieved;<br>• Understand the use of block diagrams & the mathematical basis for the design of control systems;<br>• Design and tune process (PID) controllers;<br>• Use appropriate software tools for the modelling of plant dynamics and the design of well<br>tuned control loops; | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 731 | IFHE234 | Professional Communication | ECTA223 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 732 | IFHE234 | Radar Systems | EC408 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To introduce the fundamental concepts of RADAR and the method of detection by EM wave reflection.<br>• To study different types of RADAR systems, their modules and their operation and the areas of applications.<br>• To innovate in the analysis and design of RADAR based detection methods in applicative areas of weather-forecasting, ground resources estimation. | Course Learning Objectives<br>To introduce the fundamental concepts of RADAR and the method of detection by EM wave reflection.<br>To study different types of RADAR systems, their modules and their operation and the areas of applications.<br>To innovate in the analysis and design of RADAR based detection methods in applicative areas of weather-forecasting, ground resources estimation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 733 | IFHE234 | RF & Microwave Engineering | EC 323 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To inculcate understanding of the basics required for understanding of microwave circuit and its practical applications.<br>• To enable the students in analyzing the microwave circuits.<br>• To make the students to design and implement the microwave systems. | · Analyze the Radar signal Detection techniques | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 734 | IFHE234 | RF and Microwave MEMs | EC409 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To inculcate understanding of the basics required for understanding of microwave circuit and its practical applications.<br>• To enable the students in analyzing the microwave circuits.<br>• To make the students to design and implement the microwave systems. | Course Learning Objectives:<br>To inculcate understanding of the basics required for understanding of microwave circuit and its practical applications.<br>To enable the students in analyzing the microwave circuits.<br>To make the students to design and implement the microwave systems. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 735 | IFHE234 | Satellite Communications | EC405 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | · To introduce the principle of Satellite Communication and its practical applications | · Develops the skill to analyze the techniques of detection of Moving Target Indication by Doppler radar | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 736 | IFHE234 | Scientific Measurements | ECTA125 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | · To enable the students to understand various aspects in the design of sub-systems for satellite communication. | · The study of working of the tracking Radar makes the student fit to get a job in missile manufacturing and research sector. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 737 | IFHE234 | Sensors & Actuators | EC423 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | This course covers topics on fundamental and applications of several different types of sensors and actuators that are extensively utilized in mechanical and agricultural systems. Standard communication protocols between sensors, actuators, and control units will be covered. Moreover, the course will show how to develop a sensor and actuator systems for practical applications in agricultural and mechanical systems. Assignments will involve the use of Arduino hardware and software. | • Use concepts in common methods for converting a physical parameter into an electrical quantity<br>• Classify and explain with examples of transducers, including those for measurement of temperature, strain, motion, position and light.<br>• Choose a proper sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc<br>• Predict correctly the expected performance of various sensors<br>• Develps the skill to locate different types of sensors used in real life applications and paraphrase their importance | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 738 | IFHE234 | Smart Antennas for Mobile Communication | EC410 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | Smart antennas boost the power of a wireless network, saving energy and money and greatly increasing the range of wireless broadband.This course reflects the latest developments in CDMA and smart antennas, including the IS-95 and J-STD-008 CDMA standards, 14.4K vocoders, and techniques for designing RF location systems that meet the FCC's stringent E-911 requirements. | • Study the CDMA spatial processors to analyze the multi-cell systems.<br>• Analyze the channel models for smart antenna systems.<br>• Study the environmental parameters for signal processing of smart antenna systems.<br>• Evaluate the requirements for the design and implementation of smart antenna systems based on these student able to become an entrepreneur. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 739 | IFHE234 | Special Machines | EE414 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To expose the students to the construction, principle of operation and performance of special electrical machines as an extension to the study of basic electrical machines.<br>• To understand Operation and performance of variable reluctance motors, Hybrid motors, Switched reluctance motors, Permanent magnet synchronous motor | At the end of the course, a student will be able to:<br>CO1. Use concepts in trigonometry, complex algebra, phasor operations and principles ofelectromagnetism to find correct solutions to electrical machine performance questions.Select proper materials and methods for design and construction of electrical machines withinthe realm of manufacturing, economic, performance, efficiency and environmental constraints.<br>CO2. Use modeling/simulation parameters with standard equivalent circuit models to predictcorrectly the expected performance of various general-purpose electrical machines.<br>CO3. Compare accepted standards and guidelines to select appropriate electrical machines to meetspecified performance requirements.<br>CO4. Demonstrate an understanding of the fundamental control practices associated with rotating machines (starting, reversing, braking, speed control etc.).<br>CO5. Set up testing strategies to evaluate performance characteristics of electrical | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 740 | IFHE234 | Stochastic Control Systems | EE401 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To equip students with fundamentals of uncertainties, randomness and noise in engineering systems<br>• To equip students with knowledge of tools and techniques from probability theory and systems theory<br>• To equip students with knowledge of stochastic control theory for their research | • Gain knowledge about noise, uncertainty, and randomness in the context of engineering systems<br>• Can analyze using tools and techniques from probability theory and systems theory<br>• Develops the skill to implement deterministic system model | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 741 | IFHE234 | Structure & Properties of Materials | ECES226 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | · To equip students with knowledge of tools and techniques from probability theory and systems theory | · Can analyze using tools and techniques from probability theory and systems theory | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 742 | IFHE234 | Technology Innovation Project | TIP 491 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | · To equip students with knowledge of stochastic control theory for their research | · Develops the skill to implement deterministic system model | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 743 | IFHE234 | Thermodynamics | ECES121 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 744 | IFHE234 | Thesis & Seminar | TS401 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |
| 745 | IFHE234 | Utilization of Electrical Energy | EE416 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To introduce fundamental concepts of utilization of electrical energy which emphasis on types of Electrical Drives, Electrical heating, Illumination and Electrical Traction<br>• To provide students with the skills to understand the analytical methods related to illumination design, Electrical heating, Electrical traction and Electrical drives. | • Select the proper motor for practical applications. They acquire the knowledge of electrical drives, types of motors used in Industries, types of loads and load equalization.<br>• Understand illumination and its related terms, laws. They get familiar about photometry integrated sphere and designing of lightning schemes like flood lightning, street lightning etc.<br>• Know different types of electrical heating like resistance, induction and dielectric heating<br>• Get familiar with practical implementation of electrical heating<br>• Know special features of traction motors, types of electrical traction systems in India.<br>• Know mechanics of traction analysis of speed time curves specific energy consumption. . | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 746 | IFHE234 | Vehicular Electric Power System | EE405 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To make the student understand the fundamental concepts, principles and analysis of hybrid and electric vehicles.<br>• To understand the latest developments in power system in air craft, sea and undersea vehicles | • Understand the various aspects of hybrid and electric vehicles<br>• Plan the selection of electrical machines for hybrid and electric vehicles<br>• Select various energy storage technologies for hybrid and electric vehicles<br>• Implement energy management techniques for hybrid and electric vehicles<br>• Demonstrate the power system of various vehicular system | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 747 | IFHE234 | VLSI Design for Testability | EC414 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | This course is a comprehensive introduction and reference for all aspects of IC testing. It includes all of the basic concepts and theories necessary for students, from practical test strategies and industrial practice, to the economic and managerial aspects of testing. In addition to detailed coverage of digital network testing, VLSI testing also considers in depth the growing area of testing analogue and mixed analogue/digital ICs, used particularly in signal processing. | • To recall and identify the VLSI faults, Test generation for VLSI circuits<br>• To obtain sequential ATPG methods<br>• To apply fault tolerance techniques for VLSI faults faced by the organization<br>• To compare the different fault tolerance techniques in VLSI<br>• To generalize the faulty tolerance techniques and analyze the faults<br>• Synthesis for Fault models for diagnosis. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 748 | IFHE234 | Wireless Communication Networks | EC403 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | • To develop the communication network concepts, with emphasis on wireless technologies. | • Understand the wireless communications and networks, and the associated technologies.<br>• Gain knowledge of networking and wireless networking.<br>• The project activity develops the skill in finding the appropriate modulation techniques for signal processing. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 749 | IFHE234 | Workshop Practice | ECTA126 | B.Tech in Electronics & Communication Engineering | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 750 | IFHE 236 | Additive Manufacturing Processes and Applications | ME492 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | To introduce students the basics of additive manufacturing/rapid prototyping and its applications in various fields, reverse engineering techniques.<br>• To familiarize students with different processes in rapid prototyping systems.<br>• To teach students about mechanical properties and geometric issues relating to specific rapid prototyping applications. | Upon successful completion of the course student will be able to:<br><br>CO1 Students will be able to categorize different material removal, joining processes as per the requirements of material being used to manufacture end product.<br>CO2 Students will be able to select material processing technique with the aim of cost reduction, reducing material wastage & machining time.<br>CO3 Students will be able to identify the process parameters affecting the product quality in various advanced machining of metals/ non-metals, ceramics and composites.<br>CO4 Students will be able to combine & develop novel hybrid techniques from the state of art techniques available.<br>CO5 Students will be able to perform process analysis taking into account the various responses considered in a process. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 751 | IFHE 236 | Advances in Material Science | ME405 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To provide a fundamental knowledge of materials technology and the property of materials, which will enable the appropriate choice of material.<br>• To understand construction materials technology provides knowledge concerning the important relationship between the structure and properties of various materials, and how, in practice, material properties may be managed and controlled through technological processes.<br>• To understand the phenomena of creep, fatigue and fracture, explanation about corrosion, behavior and properties of polymers, ceramics and composites etc. | • The course ends with using the knowledge gained for material selection, for a given product/situation.<br>• This course will also help to Construction of new materials.<br>• With the skills acquired the students can re invent the material models in coming with new materials and its behaviours against various conditions.<br>• Employability is high as the students with these skills are helpful in the R&D Sectors and its supporting industries. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 752 | IFHE 236 | Applied Thermodynamics-I | ME311 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To impart the knowledge of engine components, working principles of IC engines, auxiliary systems, the combustion aspects of SI and CI engines in addition to the methods of improving performance.<br>• To understand working of Reciprocating and Rotary Compressors. The student also shall apply the thermodynamic concepts in a compressors<br>• To apply the laws of Thermodynamics to analyze refrigeration cycles and Air-conditioning applications | • Understand different gas power cycles and their applications, and calculate efficiency<br>• Understand the functionality of the major components of the IC Engines and effects of operating conditions on their performance.<br>• Evaluate the performance of IC engines and compressors under the given operating conditions.<br>• Apply the laws of Thermodynamics to evaluate the performance of Refrigeration and air-conditioning cycles. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 753 | IFHE 236 | Applied Thermodynamics-II | ME428 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To learn working of reciprocating and rotary compressors and apply the thermodynamic concepts to estimate the efficiency and other parameters<br>• To enable student to work with problems related to boilers, turbine and other heat engines<br>• To apply the laws of thermodynamics to analyze real world problems | • Appreciate the working principles and thermodynamic concepts relate to various heat engines and equipment like IC engines, boilers, turbines, compressors, etc<br>• Estimate and solve the problems of the above equipment | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 754 | IFHE 236 | Automotive Engineering | ME412 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To make the students familiar with automotive vehicles.<br>• To understand principles of operation of various automobile systems.<br>• To understand performance evaluation characteristics of various automobile components.<br>• To understand automobile emission sources and the techniques adapted to control. | CO1 The student acquires the knowledge of the construction and operating principles of various components as a part of total vehicle system.<br>CO2 The student understands automotive theory and technical skills.<br>CO3 Ability to learn the basic design knowledge of various automobile systems. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 755 | IFHE 236 | Chemistry | MECHEM 111 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | · To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | · The student understands automotive theory and technical skills. | 20% | 35% | 10% | 35% | 100.00% |
| 756 | IFHE 236 | Complex Variables | MEMATH215 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of<br>functions of complex variables; analytic functions; contour<br>integrations and to furnish an introduction to their applications." | · Ability to learn the basic design knowledge of various automobile systems. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

S.Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 757 | IFHE 236 | Computational Fluid Dynamics | ME417 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | To introduce the student to widely used techniques in the numerical solution of fluid equations, issues that arise in the solution of such equations, and modern trends in CFD. Emphasis will be on 'learning by doing', as students will work on programming projects for assignments. | CO1 Develop an understanding for the major theories, approaches and methodologies used in CFD.<br>CO2 Build up the skills in the actual implementation of CFD methods for mechanical engineering design, analysis and application.<br>CO3 Work effectively with engineering and science teams as well as with multidisciplinary designs.<br>CO4 The skills acquired by the students are the practically implementing the numerical problems through simulation softwares and counteracting the time spend in solving numerical problems.<br>CO5 Employability is high as the course covers the practical problems and case studies in acquiring the descent skills of CFD. The industries like petroleum, marine and similar industries are high in demand of this skilled people. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 758 | IFHE 236 | Computer Aided Design | ME324 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | The objective of the course is to learn the software developing skills for structural design, to learn the fundamentals of Computer Aided Drafting and to study the different software packages for analysis and design | Upon successful completion of the course student will be able to implement Computer Aided Drafting, apply the software skills in the design of infrastructure and run various software packages. After under going the lab activities, the students will be having handson experience with the industry projects and there by increase the employability. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 759 | IFHE 236 | Computer Aided manufacturing | ME403 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • Provide basic foundation in computer aided design / manufacturing<br>• Understand the fundamentals used to create and manipulate geometric models<br>• Get acquainted with the basic CAD software designed for geometric modeling<br>• Learn working principles of NC machines CNC control and part programming<br>• Understand concept of Group Technology, FMS and CIM | CO1 Describe basic concepts of CAM application and understand CAM wheel<br>CO2 Prepare CNC programs for manufacturing of different geometries on milling and lathe machines.<br>CO3 Prepare logic diagram for different application of automation.<br>CO4 Classify different components using different techniques of group technology<br>CO5 Prepare Process planning for different components<br>CO6 Select layouts of FMS for industrial applications<br>CO7 Describe Robot for preliminary industrial applications like pick and place.<br>CO8 Identify application of PPC, JIT, MRP-I, MRP-II, and Expert system to CAM | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 760 | IFHE 236 | Computer Programming I | META116 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures –- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 761 | IFHE 236 | Computer Programming II | META127 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 762 | IFHE 236 | Control Systems | MEAO312 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 763 | IFHE 236 | Cryogenics | ME415 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | 1 To provide the knowledge of evolution of low temperature science<br>2 To provide knowledge on the properties of materials at low temperature<br>3 To familiarize with various gas liquefaction and refrigeration systems and to provide design aspects of cryogenic storage and transfer lines | CO1 Understand the basic properties of cryogenic fluids<br>CO2 Understand the basic concepts of refrigeration and liquefaction<br>CO3 Understand the basic concepts cryogenic insulation<br>CO4 Understand the principle of storage and processing of cryogenic liquids<br>CO5 Understand the equipment in cryogenic liquids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 764 | IFHE 236 | Design of Machine Elements | ME321 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | Objective 1: To teach students how to apply the concepts of stress analysis, theories of failure and material science to analyze, design and/or select commonly used machine components.<br>Objective 2: To illustrate to students the variety of mechanical components available and emphasize the need to continue learning.<br>Objective 3: To teach students how to apply mechanical engineering design theory to identify and quantify machine elements in the design of commonly used mechanical systems.<br>Objective 4: To teach students how to apply computer based techniques in the analysis, design and/or selection of machine components. | CO1 Able to understand the need of design<br>CO2 Understand the difference between component level design and system level design.<br>CO3 Apply design principles for optimum design of mechanical components.<br>CO4 Handle system level projects from concept to product. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 765 | IFHE 236 | Differential Equations & Fourier Series | MEMATH216 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 766 | IFHE 236 | Digital Electronics | MEES212 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 767 | IFHE 236 | Electrical Sciences I | MEES211 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 768 | IFHE 236 | Electrical Sciences II | MEES221 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 769 | IFHE 236 | Engineering Graphics | META115 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 770 | IFHE 236 | Engineering Measurements | META222 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 771 | IFHE 236 | Engineering Mechanics | MEES213 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 772 | IFHE 236 | English Language Skills | MEEGL112 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 773 | IFHE 236 | Environmental Science | MEEVS117 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 774 | IFHE 236 | Fluid Mechanics | ME221 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | Fluid Mechanics is considered as one of the basic subjects for mechanical & civil engineering students as it develops thinking and imaginative capacity of the students. An engineer who successfully copes with new problems in the field must have a sound understanding of fundamental principles. The present course is designed to prepare the students in this direction. The contents of the syllabus have been developed keeping in this mind, so that the students are exposed to a variety of situations that will test their understanding of the subject both at the conceptual and analytical skills. | The student will understand stress-strain relationship in fluids, classify their behavior and also establish force balance in static systems. Further they would develop dimensionless groups that help in scale-up and scale-down of fluid flow systems.<br>Students will be able to apply Bernouli principle and compute pressure drop in flow systems of different configurations.<br>Students will compute power requirement in fixed bed system and determine minimum fluidization velocity in fluidized bed.<br>Students will be skilled to perform the functioning of flow metering devices. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)
ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 775 | IFHE 236 | Higher Calculus | MEMATH123 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | Students will be able to apply Bernouli principle and compute pressure drop in flow systems of different configurations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 776 | IFHE 236 | Hydraulics & Hydraulic Machinery | ME313 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To make the student understand fundamentals of fluid flow interaction with different objects<br>• To make the student to understand various hydraulic machines and their applications<br>• To enable student to develop and design various hydraulic machines like turbines, pumps | • Understand the flow over channels<br>• Estimate the forces acting on vanes<br>• Apply the principles to design pumps<br>• Identify suitable turbines for available conditions<br>• Calculate the output and efficiency of different turbines and pumps | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 777 | IFHE 236 | Internship Program I | IP 221 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcomes of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 778 | IFHE 236 | Internship Program II | IP401 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 779 | IFHE 236 | IoT and Cloud Computing in Manufacturing | ME425 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | This is the course in a series of courses at the IoT gateway level. The Clouds are a large pool of easily usable and accessible virtualized resources such as hardware, development platforms, and/or services. The course introduces cloud deployment models and services(IaaS, PaaS, and SaaS). The course also covers the concepts of multi-tenancy, resource pooling, API, and measured service- pay per use that are critical and necessary while developing applications for IoT devices. | Design an IoT system with cloud infrastructure<br>Implement the M2M Communication protocols in a prototype<br>Understand the basic concepts of the main sensors used in electromechanical systems<br>Understand/implement computer models of common engineering information types.<br>Understand storage mechanisms / analysis algorithms for data management in distributed & data intensive applications | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 780 | IFHE 236 | Kinematics and Dynamics of Machines | ME322 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | On completing the course, the student will be able to:<br>1. Understand the fundamentals of the theory of kinematics and dynamics of machines.<br>2. Understand techniques for studying motion of machines and their components.<br>3. Use computer software packages in modern design of machines. | CO1 Demonstrate the concepts of various mechanisms and pairs along with velocity and acceleration analysis of simple mechanisms<br>CO2 Design a layout of cam for specified motion<br>CO3 Understand the application area of belt, rope and chain drives in industry<br>CO4 Demonstrate the principle of gears and gear train | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayadeva

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 781 | IFHE 236 | Linear Algebra | MEMATH113 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 782 | IFHE 236 | Machine Drawing | ME312 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To introduce students to the basics and standards of engineering drawing related to machines and components<br>• To familiarize students with various limits, fits and tolerances<br>• To enable the students to gain knowledge about standard CAD packages on modeling, assembling and drafting | • Understand, analyze and apply the knowledge of various standards and specifications to standard machine components<br>• Analyze and model the components of given drawings and convert them to 3D models using AutoCAD and Creo Parametric software<br>• Analyze, and apply the techniques of advanced Creo Parametric CAD modules for further applications and research | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 783 | IFHE 236 | Machine to Machine Communication | ME426 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | After completing the course the student shall be able to:<br>- Identify the main challenges associated with M2M Communications today.<br>- List the main standards, protocols, algorithms, and research activities which address these challenges of today.<br>- Describe how these standards/protocols and algorithms solve the challenges at hand.<br>- Identify limits of standards/protocols and algorithms with respect to M2M communications.<br>- Combine different standards/protocols/approaches of different areas (capillary, auxilary) into a single system conceptually and indentify performance bottlenecks.<br>- Be able to search, find, evaluate and present scientific articles and international standardization documents. | After completing the course the student shall be able to:<br>- Identify the main challenges associated with M2M Communications today.<br>- List the main standards, protocols, algorithms, and research activities which address these challenges of today.<br>- Describe how these standards/protocols and algorithms solve the challenges at hand.<br>- Identify limits of standards/protocols and algorithms with respect to M2M communications.<br>- Combine different standards/protocols/approaches of different areas (capillary, auxilary) into a single system conceptually and indentify performance bottlenecks.<br>- Be able to search, find, evaluate and present scientific articles and international standardization documents. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 784 | IFHE 236 | Machine Tools & Metrology | ME323 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To introduce different manufacturing processes like turning, drilling, milling shaping, planning.<br>• To enable student to apply the principles in selecting manufacturing processes for different components<br>• To enable student to estimate the manufacturing tiMEin the machining processes<br>• To perform various tests on machines and machine tool elements<br>• To introduce latest manufacturing and unconventional manufacturing techniques | • Learn the manufacturing processes including machining, casting, welding, and forming<br>• Estimate the machining time and decide the sequence of processes<br>• Apply the principles of Non-traditional machining<br>• Perform alignment tests and inspect and different machine elements<br>• Design a gauge for a inspecting components | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 785 | IFHE 236 | Mechanical Equipment Design | ME407 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | To design machine components which are subjected to fluctuating loads. To distinguish different design criterions and their procedure to carry out the required design steps for designing mechanical components. To design machine components/parts based on creep criterions | Objective 1: To teach students how to apply the concepts of stress analysis, theories of failure and material science to analyze, design and/or select commonly used machine components.<br>Objective 2: To illustrate to students the variety of mechanical components available and emphasize the need to continue learning.<br>Objective 3: To teach students how to apply mechanical engineering design theory to identify and quantify machine elements in the design of commonly used mechanical systems.<br>Objective 4: To teach students how to apply computer based techniques in the analysis, design and/or selection of machine components. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)
ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 786 | IFHE 236 | Mechanics of Composite Materials | ME409 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | Explain the behavior of constituents in the composite materials • Enlighten the students in different types of reinforcement • Develop the student's skills in understanding the different manufacturing methods available for composite material. | Upon completion of this course the student will be able to:<br>1. Explain the mechanical behavior of layered composites compared to isotropic materials.<br>2. Apply constitutive equations of composite materials and understand mechanical behavior at micro and macro levels.<br>3. Determine stresses and strains relation in composites materials. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 787 | IFHE 236 | Mechanics of Solid | ME211 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | The objective of the course is to learn the concepts of stress, strain, compound stress, section modulus, shear force diagram, bending moment diagram, theory of simple bending, deflection in beams, torsion of shaft and springs, columns and struts, analysis of thin walled and thick walled cylinders. | Upon successful completion of the course students will be able to draw SFD, BMD. The student will be thourough with behaviour of coulumns and he will be able to find pressures induced in thin & thick cylinders. Determination of deflection in beams and springs torque developed in the shafts, through experiments enhances the skill development in students. | 20.00% | 35.00% | 10.00% | 35.00% | 00.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 788 | IFHE 236 | Mechatronics | ME423 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | 1. Understand key elements of Mechatronics system, representation into block diagram<br>2. Understand concept of transfer function, reduction and analysis<br>3. Understand principles of sensors, its characteristics, interfacing with DAQ microcontroller<br>4. Understand the concept of PLC system and its ladder programming, and significance of PLC systems in industrial application<br>5. Understand the system modeling and analysis in time domain and frequency domain.<br>6. Understand control actions such as Proportional, derivative and integral and study its significance in industrial applications | CO1 An ability to use commercial software tools for modeling and simulation of mechatronic systems<br>CO2 An ability to design, analyze, and optimize mechatronic products<br>CO3 An ability to write technical reports and present engineering design solutions efficiently<br>CO4 Combination of Mechanical and electronics skills helps in getting employable in the industries with maximize approach towards the application of mechanical and electronic capabilities. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 789 | IFHE 251 | Nanotechnology | PHY324 | B. Sc. Physics | FST (IcfaiTech) | • To introduce and provide a broad view of the field of nanoscience and nanotechnology to undergraduates<br>• To provide knowledge on the various synthesis and characterization techniques.<br><br>• To introduce students to the applications of nanomaterials | • describe the basic science behind the properties of materials at the nanometre scale,<br>• understand the various techniques of preparation of nano-materials<br>• describe the principles behind experimental techniques for studying nanomaterials.<br><br>• understand the inter-disciplinary applications of nanotechnology | 0.2 | 0.35 | 0.1 | % | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 790 | IFHE 236 | Nonconventional Sources of Energy | ME416 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | 1. Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells. 2. Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation | CO1 analyse solar thermal and photovoltaic systems and related technologies for energy conversion.<br>CO2 Wind energy conversion and devices available for it.<br>CO3 Biomass conversion technologies.<br>CO4 Geo thermal resources and energy conversion principles and technologies.<br>CO5 Power from oceans (thermal, wave, tidal) and conversion and devices.<br>CO6 Fundamentals of fuel cells and commercial batteries.<br>CO7 Advanced skills of latest technologies are covered with this course content.<br>CO8 Employability is high as the latest trends covered in this course keep updating by which students can streamline in acquiring and updating themselves to the latest technologies. The industries like renewable energy, solar, green industries, etc are high in demand for this skilled students. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 791 | IFHE 236 | Numerical Methods | MEAO311 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |
| 792 | IFHE 236 | Optimization Techniques | MEAO225 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION REGISTRAR

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 793 | IFHE 236 | Physics II | MEPHY124 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 794 | IFHE 236 | Physics I | MEPHY114 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 795 | IFHE 236 | Power Plant Engineering | ME414 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | To introduce students to different aspects of power plant engineering. To familiarize the students to the working of power plants based on different fuels. To expose the students to the principles of safety and environmental issues. | CO1 Demonstrate a basic understanding of various types of power plants.<br>CO2 Acquire knowledge and hands-on competence in the design and development of mechanical systems associated with power plants.<br>CO3 Compare different energy resources and choose the most appropriate based on local conditions<br>CO4 Perform simple techno-economical assessments of energy resources<br>CO5 Design power plant that meets specific energy demands that are economically feasible and have a minimal Impact on the environment | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 796 | IFHE 236 | Precision Engineering | ME404 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | How to achieve these objectives:<br>Understanding the meaning of accuracy and precision<br>Knowing the phenomena that influence accuracy and precision<br>Make useful models of systems<br>Calculate essential elements to predict accuracy and precision<br>Choose suitable design concepts | Identify various gauges for measurement.<br>Demonstrate linear and angular measurement using precision instruments.<br>Apply the load cell to measure the force and torque<br>Use thermocouple and vibrometer for taking measurement.<br>Measure pressure and surface roughness<br>Measure length and angles using line-graduated instruments, i. e. vernier callipers, micrometers, bevel protractor, sine bar and surface plates; | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 797 | IFHE 236 | Principles of Economics | MEECON214 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 798 | IFHE 236 | Principles of Management | MEMGTS224 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION (Deemed-to-be University Under Section 3 of UGC Act, 1956) REGISTERED
ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 799 | IFHE 236 | Probability and Statistics | MEAO122 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 800 | IFHE 236 | Production Planning & Control | ME418 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | To understand the problems and opportunities faced by the operations manager in manufacturing and service organizations. To develop an ability to apply PPC concepts in a various areas like marketing, accounting, finance, engineering, personnel management, logistics | CO1 To have understanding about work estimate of a specified manufacturing product and explain the importance of value analysis/ value management for both product and process design.<br>CO2 Understand the production control methods which can be applied to specific situations and state their relationship to the product/process involved.<br>CO3 Apply scheduling and material control techniques to various specified situations. Include an explanation of the need for inventory minimisation procedures and how these might conflict with delivery response objectives.<br>CO4 Through the technical knowledge and the skills acquired through this course helps the students in practical work in the industries like heavy manufacturing industries, etc.<br>CO5 Employability is high as the industries require these skills as an added advantage in covering various domains of the industries. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 801 | IFHE 236 | Production Techniques | ME314 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To introduce different manufacturing processes like casting, metal forming, welding<br>• To impart the knowledge about conventional and emerging technologies in the field of Foundry, Forming and Welding<br>• To enable student to apply the principles in selecting manufacturing processes for different components<br>• To enable student to estimate the manufacturing time | CO1 Learn the manufacturing processes including casting, welding, and forming<br>CO2 Estimate the machining time and decide the sequence of processes<br>CO3 Identify suitable hybrid welding process for welding a given material<br>CO4 Design and implementation of specific technologies and processes addressed during the course. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 802 | IFHE 236 | Professional Communication | META223 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | . Estimate the machining tiME and decide the sequence of processes | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 803 | IFHE 236 | Quality Assurance & Reliability | ME421 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | This course introduces students to concepts and methods of modern statistical quality control. Students learn to apply standard quality control tools. They learn the theoretical statistical concepts that justify the use of particular quality control tools in particular situations. They learn theory and methods for analyzing the performance of different quality control tools. The use of appropriate software for statistical and quality analysis is taught, and is necessary for successful completion of some homework assignments. Issues of ethics and professional responsibility and their relation to product quality are discussed | · Identify suitable hybrid welding process for welding a given material | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 804 | IFHE 236 | Refrigeration and Air Conditioning | ME413 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To study the basic concepts of refrigeration, cycles, and systems<br>• To study various types of refrigeration systems and estimate performance characteristics<br>• To study concepts in air conditioning systems and estimate performance characteristics | • Understand the components of air refrigeration and other types of cooling systems<br>• Perform heat load calculations<br>• Apply the psychometric concepts to design air-conditioning systems | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 805 | IFHE 236 | Reverse Engineering | ME427 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | After the completion of the course, students should be able to:<br>• Understand basic engineering systems.<br>• Understand the terminologies related to re-engineering, forward engineering, and reverse engineering.<br>• Disassemble products and specify the interactions between its subsystems and their functionality<br>• Understand Reverse Engineering methodologies.<br>• Understand Reverse engineering of Systems, Mechanical RE, Electronic RE, and Computer RE | Course Outcomes: After completion of this course, student will be able to<br>1. Understand the problem in the existing process.<br>2. Collect the large number of data/ information for the product<br>3. Depth analyze of the products and extraction of real time data<br>4. Understand the principles behind the design of the product, ways to redesign and improve the performance of the system. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 806 | IFHE 236 | Robotics & Automation | ME424 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | To introduce the concepts of Robotic system, its components and instrumentation and control related to robotics. | CO1 Undertake kinematics analysis of robot manipulators<br>CO2 Understand the importance of robot dynamics<br>CO3 Have an understanding of the functionality and limitations of robot actuators and sensors<br>CO4 Understand and be able to apply a variety of techniques to solve problems in areas such as robot control and navigation<br><br>CO5 To be able to program a robot to perform a specified task (e.g obstacle avoidance or wall following) in a target environment. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 807 | IFHE 236 | Scientific Measurements | META125 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 808 | IFHE 236 | Structure & Properties of Materials | MEES226 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 809 | IFHE 236 | Supply Chain Management | ME419 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | 1. To understand how Logistics, Supply Chain, Operations, Channels of Distribution fit in to various types of Business viz., Manufacturing, Service and Project. 2. To understand how Warehouse Management and, other functions in Logistics fits into Logistics & Supply Chain Management. | CO1. Define and establish the strategic importance of logistics to achieve business success by creating value through supply chains.<br>CO2. Analyzing, comparing and interpreting the combination of customer accommodation, market distribution, procurement, and manufacturing represents the supply chain areas that are linked and supported by logistics and lean management.<br>CO3. Estimate and evaluate the concept of operational integration and global supply chain integration.<br>CO4. Discuss models for integrative logistics and supply chain in a theoretical framework. Recognize how structure provides the basis for increasing the capacity of the supply chain. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Umapathy
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION ★ HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 810 | IFHE 236 | Technology Innovation Project | TIP 491 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S. Vijayalakshmi

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 811 | IFHE 236 | Theory of Elasticity | ME408 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To know the concept of three dimensional stresses<br>• To know the concept of three dimensional strains<br>• To understand the Hooke's Law for Anisotropic Elasticity, Isotropic Elasticity and Orthotropic materials<br>• To know the significance of the failure theories.<br>• To calculate the hoop and longitudinal stress of thin and thick cylinders<br>• To know the stress-strain relation and failure criteria for the Composite materials. | • Understand the Three dimensional stresses<br>• Understand the Three dimensional strains and stress –strain relations for linearly elastic solids<br>• Understand the Theories of failure<br>• Determine the stresses and strains in thick and thin cylinders<br>• Determine the stresses in composite materials. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 812 | IFHE 236 | Thermodynamics | MEES121 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 813 | IFHE 236 | Thesis & Seminar | TS401 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 814 | IFHE 236 | Vibration Control | ME410 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | • Provides the importance of study of vibration<br>• Enhances the vibration analysis procedure for physical systems<br>• Determines the amount of damping for a given system<br>• Finds the response of an un damped system under harmonic force<br>• Creates awareness about the vibration isolation materials<br>• Writing the equations of motion for physical systems | • Finds the natural frequencies for a single and multi degree of freedom systems<br>• Provides the information about the vibration measurements<br>• Gives the knowledge about signal analysis<br>• Determines the response of the systems under periodic and no<br>• periodic forces<br>• Importance of the machine condition monitoring<br>• Analysis of the free and forced vibration of viscously damped systems<br>• Skills through this course is of highly practical oriuented and laboratory through approach in identifying and solving the problems pertaining to vibrations.<br>• Employability is high in the heavy industries where the monitoring and controlling of vinrations place a major role and the students with these skills be highly in need. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 815 | IFHE 236 | Workshop Practice | META126 | B.Tech in Mechanical Engineering | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 816 | IFHE235 | Actuators, Drives &Sensors | MEC322 | B.Tech in Mechatronics | FST (IcfaiTech) | One of the key elements in the implementation of mechatronic systems is the integration of computational intelligence with sensing (measurement of environmental conditions) and actuation (affecting the surrounding environment through a controlled response). In this course, students are<br>introduced to advanced concepts in sensing and actuation for mechatronic systems, including both traditional sensors and actuators an introduction to advanced topics in micro electromechanical system (MEMS) sensing, and smart materials | CO1: Use concepts in common methods for converting a physical parameter into an electrical quantity<br>CO2: Classify and explain with examples of transducers, including those for measurement of temperature, strain, motion, position and light.<br>CO3: Choose a proper sensor comparing different standards and guidelines to make sensitive measurements of physical parameters' like pressure, flow, acceleration, etc.<br>CO4: Predict correctly the expected performance of various sensors<br>CO5: Develops the skill to locate different types of sensors used in real life applications and paraphrase their importance | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)
ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 817 | IFHE235 | Advances in Robotics | MEC 401 | B.Tech in Mechatronics | FST (IcfaiTech) | After the course, the student should be able to:<br><br>Describe what a robot is, their origin, types, and applications<br>Describe, compare, and apply robot control stategies<br>Apply robot software tools (simulation, operating systems)<br>Apply bio-inspired solutions and machine learning appropriately in robotics<br>Formulate and reflect on robot solutions to real-world problems | CO1 Describe and explain the advanced concepts on robotics like flexible manipulators, mobile robots etc<br>CO2 Select and identify suitable elements for making quadrotor<br>CO3 Able to demonstrate self learning capability and to apply to social problems | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 818 | IFHE235 | Autotronics | MEC 408 | B.Tech in Mechatronics | FST (IcfaiTech) | The objective of (Autotronics) is to develop and understand the principles of conversion in design, construction and working of mechanical systems and electronic systems in automobiles | CO1. Understand the different automotive electrical systems, energy storages and ignition systems and the electronic components involved<br>CO2. Developing the process of learning through a comprehensive educational plan<br>CO3. Identify the fault diagnosis and preventive measures.<br>CO4. Introducing the importance of this advanced technology to the public with the aid of providing appropriate atmosphere to create and distinguish.<br>CO5. With the combination skills of automobile and robotics will enhance the students to apply their understanding in the fields of automotive and electronics areas and also get employable with the organizations pertaining to it. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 819 | IFHE235 | Bio Mechanics | MEC 409 | B.Tech in Mechatronics | FST (IcfaiTech) | The objective of this course is to provide you with an overview of the major challenges in movement biomechanics and experience with the engineering tools we use to address these challenges. We will achieve this objective through lectures, a field trip to a motion capture laboratory, homework problems, simulation exercises, and student research papers and presentations.<br>After completing this course, you will be able to:<br>1) Describe the biological, mechanical, and neurological mechanisms by which muscles produce movement<br>2) Identify and use engineering tools that are used to study movement<br>3) Write and solve equations of motion for simple models of human movement<br>4) Apply biomechanics principles to "real-world" clinical and biomechanical research. | CO1. Describe motion with precise, well-defined mechanical and anatomical terminology;<br>CO2. Understand and quantify linear and angular characteristics of motion;<br>CO3. Understand the quantitative relationships between angular and linear motion characteristics of a rotating body;<br>CO4. Understand and quantify the cause and effect relationship between force and linear and angular motion;<br>CO5. Multidisciplinary skills of these content help the students to apply the knowledge of the mechanics in the field biomedical in terms of equilibrium, motion, etc.<br>CO6. With these contents the employability of the students are very high in the areas of Medical, Instrumentation, etc | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 820 | IFHE235 | Bio Mechatronics | MEC 410 | B.Tech in Mechatronics | FST (IcfaiTech) | 1) Comprehensive abilities on Biomechatronics product design based on interdisciplinary subjects.<br>2) Knowledge on frontiers of Biomechatronics Engineering, deep understanding on some specific points.<br>3) Ability on Biomechatronics Engineering product analysis and development based on specific market and management skills.<br>4) Ability to coordinate multiple, interdisciplinary tasks in order to achieve a common objective.<br>5) Reinforce specific knowledge from other courses through practice and reflection in an actionoriented setting<br>6) Enhance team working skills. | CO1. Work and contribute on sensors and actuators used in biomedical system designs.<br>CO2. Design and development of prosthetic limb<br>CO3. Develop the hearing aid equipment's<br>CO4. Design Tactile devices for visually challenged people<br>CO5. Use the CT & MRI data for engineering applications<br><br>CO6. The employability of the students are high in the industries mentioned which are in line with Medical, Healthcare, etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 821 | IFHE235 | Chemistry | MECCHEM 111 | B.Tech in Mechatronics | FST (IcfaiTech) | · To integrate the principles of Inorganic, Physical and Industrial chemistry with the relevant domains of core engineering courses offered at B.Tech level.<br>• To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.<br>• Provides a comprehensive survey of underlying principles that govern the properties and behavior of chemical systems.<br>• The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems. | • Understand the chemical behaviour of matter and materials using fundamental knowledge of their nature (i.e. electrons and intermolecular forces)<br>• Correlate the concepts of thermodynamics learnt with the study of engineering devices covered in Mechanical Engineering.<br>• Use fundamental chemical principles to make predictions about reactivity and general properties of materials of the built environment.<br>• Predict potential complications from combining various chemicals or metals in an engineering setting.<br>• Apply concepts learnt to the basic requirements of Civil Engineering, particularly focusing to the built environment<br>• Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables. | 20% | 35% | 10% | 35% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 822 | IFHE235 | CNC Technology | MEC 423 | B.Tech in Mechatronics | FST (IcfaiTech) | Evaluate manufacturing assignment based on critical thinking and problem solving skills.<br>Become a good communicator and effective team member.<br>Practice writing complex "G" code programs for CNC turning centers that meet the part specification<br>Interpret and demonstrate complex "G" code programs for CNC milling centers that meet the part specification<br>Prepare "G: code programs to perform secondary operations including tapping, countersinking, counter boring, and threading.<br>Describe and illustrate common problems with tooling and fixtures in CNC programming and | CO1. Apply the knowledge of automation processes in various industries.<br>CO2. Apply advanced machine tools like NC, CNC in manufacturing process.<br>CO3. Interpret software and hardware configurations in manufacturing process.<br>CO4. Analyze the programming execution in electronic components.<br>CO5. Write the programming for machine tools like NC, CNC.<br>CO6. With the skills of CNC technology the employability chances are very high with both simulation and practical understanding and experience of working. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 823 | IFHE235 | Cognitive Robotics | MEC 417 | B.Tech in Mechatronics | FST (IcfaiTech) | The objective of this course is to introduce students, researchers to this new field of robotics with the help of illustrative models, facts and relevant theories. | CO1 Understand cognitive robotics<br>CO2 Human machine cognitive system<br>CO3 AI approach into Robotics will help the students to update their skills into the area of Cognitive Robotics.<br>CO4 Employable aspects are very high with respect to human robot interactions through this course are highly anticipated. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 824 | IFHE235 | Complex Variables | MECMATH215 | B.Tech in Mechatronics | FST (IcfaiTech) | "This course is aimed to provide an introduction to the theories of functions of complex variables; analytic functions; contour integrations and to furnish an introduction to their applications." | • Define continuity and differentiability for complex functions,<br>• Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable,<br>• Compute the radius of convergence for complex power series,<br>• Define the complex exponential function, trigonometric and hyperbolic functions and use their basic properties,<br>• Evaluate integrals along a path - directly from the definition and also via the Fundamental Theorem of Contour Integration and Cauchy's Theorem,<br>• Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues,<br>• Prove the Cauchy Residue Theorem and use it to evaluate integrals. | 20.0% | 35.0% | 10.0% | 35.0% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 825 | IFHE235 | Computational Motion Planning | MEC 403 | B.Tech in Mechatronics | FST (IcfaiTech) | Robotic systems typically include three components: a mechanism which is capable of exerting forces and torques on the environment, a perception system for sensing the world and a decision and control system which modulates the robot's behavior to achieve the desired ends. In this course we will consider the problem of how a robot decides what to do to achieve its goals. This problem is often referred to as Motion Planning and it has been formulated in various ways to model different situations. You will learn some of the most common approaches to addressing this problem including graph-based methods, randomized planners and artificial potential fields. Throughout the course, we will discuss the aspects of the problem that make planning challenging. | CO1 To model and simulate robotic mechanisms and to analyze limitations of motion and sensing in motion planning.<br>CO2 To implement motion planning methods in a complex uncertain environment.<br>CO3 To integrate control, planning and reasoning problems in autonomous systems.<br>CO4 Skills in revamping the addressing structure of solving the problems with the algorithm studied under this course content. .<br>CO5 Employable chances are very high as the computational approach in problem solving will be highly appreciated by various industries and especially with this content the student's opportunities are widened. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 826 | IFHE235 | Computer Integrated Manufacturing | MEC 424 | B.Tech in Mechatronics | FST (IcfaiTech) | Students will be able to apply knowledge about Computer Aided Quality control and Process Planning Control. Students will be able to Design Flexible manufacturing cell after carrying out Group technology study and finally creating FMS | CO1. Knowledge and operational experience of CNC lathe and milling part programming.<br>CO2. Knowledge and operational experience of programming for robots and CMM Capability to comprehend the functioning of various components of the automation and CIM. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 827 | IFHE235 | Computer Programming I | MECTA116 | B.Tech in Mechatronics | FST (IcfaiTech) | • To introduce the basic concepts of UNIX operating systems.<br>• To understand the fundamentals of Problem Solving.<br>• To learn how to design and program Python applications.<br>• To learn how to design object-oriented programs with Python classes.<br>• To learn how to use exception handling in Python applications for error handling. | • To execute shell commands in Linux.<br>• Understand, analyze and solve problems using algorithmic approach.<br>• Write Python programs using conditional statements, loops and functions.<br>• Use Python data structures –- lists, tuples, dictionaries.<br>• Do input/output with files in Python.<br>• Understand the Importance of cloud computing and its applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 828 | IFHE235 | Computer Programming II | MECTA127 | B.Tech in Mechatronics | FST (IcfaiTech) | • To introduce object-oriented programming (OOP) using the Java programming language.<br>• To learn how to use the Java SDK environment to create, debug and run simple Java programs.<br>• To introduce Arrays, Abstract Classes, Exception Handling, File I/O and Multithreading.<br>• To provide hands-on experience in developing Java applications using database connections. | 1. Understand object-oriented programming concepts and basics of java programming<br>2. Solve real world problems using OOP techniques<br>3. Understand the use of abstract classes, packages and interfaces.<br>4. Expand their knowledge of AWS cloud computing models, services and tools through narrative-based scenarios and short interactive tasks. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 829 | IFHE235 | Control Systems | MECAO312 | B.Tech in Mechatronics | FST (IcfaiTech) | • To equip the students with the fundamental concepts in control systems. | • Understand the concepts of closed loop control systems.<br>• Analyze the stability of closed loop systems.<br>• Apply the control techniques to any electrical systems.<br>• Design the classical controllers such as P, PI, etc., for electrical systems. | 20% | 35% | 10% | 35% | 100.00% |
| 830 | IFHE235 | Differential Equations & Fourier Series | MECMATH216 | B.Tech in Mechatronics | FST (IcfaiTech) | • To solve first and second order Ordinary Differential Equations by standard methods<br>• To gain exposure to Engineering applications of Ordinary Differential Equations.<br>• Introduction to Laplace Transforms for future Engineering courses<br>• Basics of Fourier series required for Engineering<br>• Solving important Partial Differential Equations (Simple cases of Wave & Heat equations). | • Solve standard ODEs of First and Second Order<br>• Compute Laplace and Inverse Laplace Transforms for functions in Engineering<br>• Expand functions in Fourier/Sine/Cosine series<br>• Obtain series solutions for standard PDEs in two variables | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 831 | IFHE235 | Digital Electronics | MECES212 | B.Tech in Mechatronics | FST (IcfaiTech) | • To obtain the knowledge of basic tools for the design of digital circuits.<br>• To understand the methods, procedures suitable for a variety of digital computers and related applications. | • Realize complex logic functions utilizing programmable logic.<br>• Apply the digital design principles in real time applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 832 | IFHE235 | Electrical Sciences I | MECES211 | B.Tech in Mechatronics | FST (IcfaiTech) | • To equip the students with a basic understanding of Electrical circuits and machines for specific types of applications. | • The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and be able to apply them in practical situation. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 833 | IFHE235 | Electrical Sciences II | MECES221 | B.Tech in Mechatronics | FST (IcfaiTech) | • Characterize semiconductors, diodes, transistors and FETs<br>• To study behavior of Diod and its applications<br>• To study characteristics of electronic devices to understand their behavior.<br>• To design simple analog circuits using BJTs, FETs and Diodes.<br>• To design and evaluate audio, Power and Feedbak amplifiers. | • Study and analyze the behavior of PN junction diodes.<br>• Characterize the current flow of a bipolar transistor in CB and CE configurations<br>• Bias the transistors and FETs for amplifier applications.<br>• Realize simple amplifier circuits using BJT and FET. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 834 | IFHE235 | Elements of Mechatronics | MEC211 | B.Tech in Mechatronics | FST (IcfaiTech) | At the end of the course, the student will be able to<br>Develop a simulation model for simple physical systems and<br>explain mechatronics design process<br>Outline appropriate sensors and actuators for an engineering<br>application<br>Write simple microcontroller programs<br>Explain linearization of nonlinear systems and elements of data<br>acquisition<br>Explain various applications of design of mechatronic systems | CO1 A student who successfully fulfills the course requirements will have demonstrated<br>CO2 An ability to identify, select, and integrate mechatronic components to meet product requirements<br>CO3 An ability to develop kinematic, dynamic and control models for robots<br>CO4 An ability to use commercial software tools for modeling and simulation of mechatronic systems<br>CO5 An ability to design, analyze, and optimize mechatronic products<br>CO6 An ability to write technical reports and present engineering design solutions efficiently | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 835 | IFHE235 | Engineering Graphics | MECTA115 | B.Tech in Mechatronics | FST (IcfaiTech) | • To enhance the visualization and imagination abilities<br>• To promote creative thinking for solving engineering problems.<br>• To take data and transform it into drawings.<br>• To learn basic Auto CAD skills<br>• To learn basic Engineering formats | • To specify units, limits of drawing. It also includes creating and editing 2 D computer geometry, and constructing lines, arcs, chamfers and fillets.<br>• Draw parallel and perpendicular lines, and to construct circles, arcs, tangencies and curves.<br>• Apply standard vertical, horizontal, radius, diameter, and other dimensions to an engineering drawing.<br>• Generate Engineering Drawings using drafting tools<br>• Visualize geometrical solids in 3D space through exercises in Orthographic Projections<br>• Draw auxiliary views and isometric views<br>• Develop the surfaces of geometrical solids | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 836 | IFHE235 | Engineering Measurements | MECTA222 | B.Tech in Mechatronics | FST (IcfaiTech) | • To give introduction to the experimental methods and measurement techniques.<br>• To train the students in the operation of various instruments and equipments and the measurement of various parameters in electronics and mechanical engineering. | Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve:<br>Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 837 | IFHE235 | Engineering Mechanics | MECES213 | B.Tech in Mechatronics | FST (IcfaiTech) | • To introduce the basic principles of engineering mechanics.<br>• To introduce concepts of equilibrium of bodies at rest and in dynamics, the motion of bodies and the forces that cause them.<br>• To emphasize analysis and application to practical engineering problems.<br>• To promote thinking and problem solving capacity of students. | • Apply the concepts of equilibrium to system of forces on rigid bodies.<br>• Simplify and clarify mechanics problems using free body diagrams.<br>• Analyze equilibrium of rigid bodies with frictional forces.<br>• Determine force couples, centre of gravity and moment of inertia of rigid bodies.<br>• Determine simple dynamic variables and solve simple dynamic problems involving kinematics, energy and momentum.<br>• Analyze simple statically determinate structures such as beams, pin jointed trusses and pin jointed frames subjected to various loading and supporting conditions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 838 | IFHE235 | English Language Skills | MECEGL112 | B.Tech in Mechatronics | FST (IcfaiTech) | • To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.<br>• To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing | • Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.<br>• Use dictionary and grammar effectively to overcome errors in reading and writing.<br>• Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 839 | IFHE235 | Environmental Science | MECEVS117 | B.Tech in Mechatronics | FST (IcfaiTech) | • To understand the fundamentals of environment<br>• To understand the science of interrelationship between the living organisms and their environment<br>• To understand the relationship between the population and the environment.<br>• To have an understanding about the land resources, water resources, air recourses and their pollution, control methods<br>• To have an understanding about the waste management.<br>• To know about the environmental policies and laws. | • Understand the natural environment and its relationships with human activities.<br>• Characterize and analyze human impacts on the environment.<br>• Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.<br>• Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.<br>• Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.<br>• Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 840 | IFHE235 | HAPTICS | MEC 402 | B.Tech in Mechatronics | FST (IcfaiTech) | The objectives of the class is for students to learn how to design systems that enable force and tactile feedback of virtual environments. The students will learn how humans perceive real objects to learn the salient properties that are necessary to be recreated in virtual environments. | CO1 How to build, program, and control haptic devices<br>CO2 Device modeling, synthesis and analysis of a haptic system<br>CO3 Demonstrate self learning capability.<br>CO4 With these skills the students can apply the haptic understanding into various applications.<br>CO5 The students are employable in the companies pertaining to Haptics, design, human machine interactions, etc. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 841 | IFHE235 | Higher Calculus | MECMATH123 | B.Tech in Mechatronics | FST (IcfaiTech) | • Use calculus to study the paths, velocities, and accelerations of moving bodies<br>• To study the applications of derivative motion in space<br>• To understand the frame of mutually orthogonal unit vectors<br>• To study the functions of more than one independent variable, the way to graph them<br>• To understand the idea of directional derivatives and the equations of tangent planes and normal lines<br>• To find extreme values of functions of several variable<br>• To find the volume of three dimensional shapes using triple integrals<br>• To calculate the work done by variable forces alone paths in space and rates at which fluids flow along curves and cross boundaries<br>• To describe the relationship between the way an incompressible fluid flows across the boundary of a plane region and the way it moves inside the region<br>• To understand Infinite summations | • Students will learn important tools of calculus in higher dimensions.<br>• Engineering applications will help the student appreciate the role of the course in B.Tech<br>• Geogebra software exposure for mathematical problem solving<br>• Students will become familiar with 2- and 3-dimensional coordinate systems.<br>• Students will also learn how to represent motion of objects in 3D using vector functions, how to represent velocity and acceleration using vector projections into tangential and centripetal coordinates of acceleration, and how to characterize curves in space by computing arc length and curvature.<br>• For functions of 3D surfaces, students will be able to characterize aspects of surfaces and volumes using partial derivatives and the gradient vector.<br>• Partial derivatives will also be used to describe approximating tangent planes to points on surfaces, and how to compute derivatives of multi-dimensional function compositions can be performed using a multidimensional version of the chain rule.<br>• Evaluating Double and Triple Integrals. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 842 | IFHE235 | Human Robot Interaction (HRI) | MEC 405 | B.Tech in Mechatronics | FST (IcfaiTech) | This course introduces students to the field of Human-Robot Interaction. Topics will include:<br>• The historical development of HRI<br>• HRI Tools and Methods<br>• Experimental design relating to HRI<br>• Robotic algorithms and sensors<br>• Social robotics<br>• Interface design | CO1. Able to explain and discuss basic HRI theory, terms, and principles<br>CO2. Apply HRI principles to design a robotic system<br>CO3. Able to use practical knowledge of HRI to complete a research project and present it to an interdisciplinary audience.<br>CO4. With the skills of HRI the students were able to create a medium for communication between the human and robotics with various algorithm pertaining to their applications.<br>CO5. The employability is high as the future turns with the robotics and its interaction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 843 | IFHE235 | Humanoids | MEC 404 | B.Tech in Mechatronics | FST (IcfaiTech) | As part of this course, students will:<br><br>Obtain a broad fundamental understanding of concepts in autonomous, robotic manipulation.<br><br>Read, review and critique technical papers, design a tutorial, present a tutorial and debate once for the Pro and Con side (assessed by written reviews, course presentation and debates).<br><br>Become familiar with the open research questions in the subject area, pose new research questions, and write a proposal (assessed by project proposal and presentation). | CO1 Understand and describe the basic properties of humanoid robots.<br>CO2 Implement and apply different methods for bipedal gait generation, such as e.g.central pattern generators and linear genetic program<br>CO3 Discuss and describe the advantages and disadvantages of humanoid robotics in relation to other kinds of robots.<br><br>CO4 The skills enhanced through this course is practical understanding of inventing the humanoids and its various applications.<br>CO5 The employability to the students are very high as this vertical of consumer applications will keep enhancing. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 844 | IFHE235 | Hydraulic and Pneumatic Systems | MEC 425 | B.Tech in Mechatronics | FST (IcfaiTech) | i. Draw symbols used in hydraulic systems.<br>ii. Operate different types of valves used in hydraulic systems<br>iii. Classify the valves used in hydraulic systems.<br>iv. Maintain different valves and auxiliaries.<br>v. Assemble pumps and motors to rectify problems.<br>vi. Develop efficient hydraulic circuits.<br>vii. Maintain the pneumatic and hydraulic system | CO1. Identify hydraulic and pneumatics components.<br>CO2. Ability to design hydraulic and pneumatic circuits. Hydraulic Pumps<br>CO3. After completion of the course the students will be upgraded with the skills to analyze fluid power components and circuits.<br>CO4. With the compatibility of design and simulating fluid power circuits with various applications.<br>CO5. The students get enough opportunities to get employable in the area of Hydraulic and Pneumatic machines.<br>CO6. With the skills of Hydraulic and Pneumatic system applications the employability chances are very high with both simulation and practical understanding and experience of working. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 845 | IFHE235 | Instrumentation & Measurement | MEC313 | B.Tech in Mechatronics | FST (IcfaiTech) | The objective of the course is to introduce the fundamentals of Electronics Instruments and Measurement providing an in-depth understanding of Measurement errors, Bridge measurements, Digital Storage Oscilloscope, Function Generator and Analyzer, Display devices, Data acquisition systems and transducers. | CO1. Design and analyze various measurement systems.<br>CO2. Elucidate the data from data acquisition systems<br>CO3. Illustrate the function and application of Electro mechanical instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 846 | IFHE235 | Internship Program I | IP 221 | B.Tech in Mechatronics | FST (IcfaiTech) | This course is run during the Summer Term only at various industries and is of about 8 weeks. This course aims to provide an exposure of the world of professional work to the students. | CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 847 | IFHE235 | Internship Program II | IP401 | B.Tech in Mechatronics | FST (IcfaiTech) | The IP II Program is planned to bridge the gap between the professional world and the academic world and is implemented during the final year of graduation in either of the semesters. This Program constitutes working on real life situations, necessary for subsequent problem-solving efforts in the professional world. | "CO1 : KNOWLEDGE To implement the skills acquired through experience or education of domain based engineering pertaining to the industries allotted.<br>CO2 : COMPREHENSION To understand the processes of company and relating the same with the concepts learned during the engineering.<br>CO3 : APPLICATION The skills acquired from the engineering helps in applying and enhancing the work assigned from the industries allotted for addressing the issues or problems assigned.<br>CO4 : ANALYSIS To study the detailed examination of the processes to identify and address in solving the problems raised with a predictive nature in solving.<br>CO5 : SYNTHESIS The combination of the theory of engineering and other technical skills helps in addressing the issues and provide the solution by drawing a path in understand the various processes in the industry.<br>CO6 : EVALUATION To reach the perceptive of the tenure during the program helps in understanding the processes in an industry and by providing the solutions for the real time problem and enhancing the outcome of the companies. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 848 | IFHE235 | Introduction to Robotics | MEC311 | B.Tech in Mechatronics | FST (IcfaiTech) | Expose students to the history and current developments in the field of robotics; Strengthen students' grasp of the mathematics and physics involved in the design, construction and control of robots, with a focus on linear algebra and geometry. programming skills. | CO1. Demonstrate the relationship between mechanical structures of industrial robots and their operational workspace characteristics.<br>CO2. Apply spatial transformation to obtain kinematic equations of robot manipulators so that forward and inverse kinematics of simple robot manipulators can be performed.<br>CO3. Perform the static force analysis and dynamic analysis of manipulator.<br>CO4. Generate joint trajectory for motion planning.<br>CO5. Demonstrate knowledge of robot manipulators. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 849 | IFHE235 | Kinematics & Dynamics of Machinery | MEC221 | B.Tech in Mechatronics | FST (IcfaiTech) | • To familiarize students with basic types of mechanisms, joints and degrees of freedom<br>• To enable the student to perform position, velocity and acceleration analysis using graphical and analytical methods<br>• To impart understanding of different types of mechanisms and their applications<br>• To teach the basics of synthesis of simple mechanisms<br>• To teach kinematic analysis of cam-follower motion and gear train configurations, belt drive etc | • Demonstrate the concepts of various mechanisms and pairs along with velocity and acceleration analysis of simple mechanisms<br>• Design a layout of cam for specified motion<br>• Understand the application area of belt, rope and chain drives in industry<br>• Demonstrate the principle of gears and gear train | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 850 | IFHE235 | Linear Algebra | MECMATH113 | B.Tech in Mechatronics | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 851 | IFHE235 | Machine Perception | MEC419 | B.Tech in Mechatronics | FST (IcfaiTech) | Students will learn about fundamental aspects of modern deep learning approaches for perception. Students will learn to implement, train and debug their own neural networks and gain a detailed understanding of cutting-edge research in learning-based computer vision, robotics and HCI. | CO1. Understand and apply a series of probabilistic models of images and objects in machine perception systems.<br>CO2. Understand the principles behind face recognition, segmentation, image parsing, super-resolution, object recognition, tracking and 3D model building.<br>CO3. Unified approach of the course content helps the students to get employable in the above mentioned industries. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 852 | IFHE235 | Manufacturing Processes | MEC323 | B.Tech in Mechatronics | FST (IcfaiTech) | The main objective of this course is to emphasize the importance manufacturing sciences in the day-to-day life, and to study the basic manufacturing processes and tools used. The course is delineated particularly to understand the conventional manufacturing processes like casting, metal forming, and welding process. | CO1. Give students the information in materials processing such as casting, forming, machining, welding,<br>CO2. Introduce the principles of basic materials processes; tools and machines used; application fields of different processes in manufacturing<br>CO3. Develop an understanding of environmental and design issues related to the processes in manufacturing | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 853 | IFHE235 | Materials for Mechatronic Systems | MEC312 | B.Tech in Mechatronics | FST (IcfaiTech) | To Introduce the basics of microprocessors and microcontrollers<br>technology and related applications. Study of the architectural details and programming of 16<br>bit 8085 microprocessor and its interfacing with various peripheral ICs and their materials | CO1. Understand the characteristics of various engineering materials.<br>CO2. Evaluate different materials used in mechanical and electronic systems.<br>CO3. Select suitable materials for various mechatronic applications. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 854 | IFHE235 | Mechatronics System Design | MEC321 | B.Tech in Mechatronics | FST (IcfaiTech) | Mechatronics system design deals with the design of controlled electromechanical systems by the integration of functional elements from a multitude of disciplines. It starts with thinking how the required function can be realized by the combination of different subsystems according to a systematic step-by-step engineering design approach applied to a realistic mechatronics design problem. | CO1. Ability to analyze electric and electronic circuits.<br>CO2. Ability to automate data acquisition (based on a microcontroller and peripherals).<br>CO3. Ability to interface hardware (microcontroller and peripherals) and software (assembly and/or C). | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 855 | IFHE235 | Medical Devices | MEC 414 | B.Tech in Mechatronics | FST (IcfaiTech) | This course is intended to introduce students to the design process, and to the tools and techniques to approach complex and multidimensional problems involving multiple stakeholders. Since it is team-based, it also requires students to develop and practice strong project management and organizational skills, in addition to communicating across disciplinary lines. | CO1 To recognize the impact of materials selection on manufacturing and medical device reprocessing<br>CO2 To apply fundamental engineering design principles to problems related to medical device design for reprocessing.<br>CO3 To analyze manufacturing processes used in medical device reprocessing as related to testing, verification and validation processes.<br>CO4 To design an example manufacturing process for a reusable medical device<br>CO5 With these skills the students are highly qualified in getting the jobs in the medical and pharma manufacturing and R&D industries. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 856 | IFHE235 | Medical Image Processing | MEC 416 | B.Tech in Mechatronics | FST (IcfaiTech) | characteristics of different types of medical images, and how to apply different classical image processing techniques to different types of medical images. Students will also learn the basic concept, structure as well as the components in Picture Archiving and Communication Systems (PACS | CO1 Will get the clear domain knowledge in understanding the various Medical Imaging techniques and its diagnostic applications.<br>CO2 Gain critical insight into challenges underpinning image analysis, including image enhancement & compensating for artefacts.<br>CO3 Develop specialized skills to interpret medical images critically & to communicate the findings to a range of audiences.<br>CO4 Demonstrate subject specific knowledge & understanding in theoretical & practical aspects of medical image analysis & processing.<br>CO5 With the skills of image processing and techniques in the contents helps the students to widen their areas of research into various diagnostics approaches and impart their understanding in improving the techniques. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 857 | IFHE235 | Micro Electro Mechanical Systems | MEC324 | B.Tech in Mechatronics | FST (IcfaiTech) | Students will be able to explain micro sensors, micro-actuators, their types and applications. Students will be able to explain about fabrication processes for producing micro-sensors and actuators. They will also be able to apply Reliability, and Failure Analysis Testing. | CO1. Understand the basic principles of operation of micro devices, micro systems and their applications.<br>CO2. Select suitable sensors for different applications of MEMS.<br>CO3. Design the micro devices, micro systems using the MEMS fabrication process.<br>CO4. Apply the concepts for manufacture of polymer and BioMEMS systems | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 858 | IFHE235 | Micro Processors & Controllers | MEC314 | B.Tech in Mechatronics | FST (IcfaiTech) | The Purpose of the course is to provide students with the Knowledge of Microprocessors and Microcontroller. To solve real world problems in an efficient manner, this course also emphasis on architecture, Programming and system design used in various day to day gadgets | CO1: Recall and apply the basic concept of digital fundamentals to Microprocessor based personal computer systems.<br>CO2: Identify the detailed s/w & h/w structure of the Microprocessor.<br>CO3: Illustrate how the different peripherals are interfaced with Microprocessor.<br>CO4: Train their practical knowledge through laboratory experiments and develop the basic programming skills.<br>CO5: The hardware oriented lab activity makes the student clear about the manufacturing & internal structure of the programmable IC, which takes him/her to catch a job. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 859 | IFHE235 | Mobile Robotics | MEC 406 | B.Tech in Mechatronics | FST (IcfaiTech) | The objective of this course is to provide the basic concepts and algorithms required to develop mobile robots that act autonomously in complex environments. The main emphasis is put on mobile robot locomotion and kinematics, environment perception, probabilistic map based localization and mapping, and motion planning. | Upon successful completion of the course, student will be able to:<br>CO1 Design a simple path and motion planning robot.<br>CO2 Elucidate and design the applications of SLAM<br>CO3 Illustrate the function of application specific Tasks of Mobile Robots.<br>CO4 Skills of implementing and understanding of various algorithms in guiding the robotics is covered through this content.<br>CO5 Employability is high as the customization of the robotics need to be addressed as per the future requirements and can be studied through this content. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 860 | IFHE235 | Nano Electro Mechanical Systems | MEC 421 | B.Tech in Mechatronics | FST (IcfaiTech) | Describe the fundamental working principle of bio-molecule sensing/sensors, and applying this knowledge to design solutions to probe biomedical and biology systems.<br>Use point fabrication procedures in practical process integration.<br>Demonstrate a detailed understanding of the fundamental principles of nanotechnology and their application to biomedical engineering.<br>Analyse the fabrication of microfluidic devices, surface functionalization and the limitations of surface micromachining.<br>Evaluate and employ electrical measurements for MEMS mechanical structure characterization, understanding possible problems encountered in livingsystems.<br>Apply research principles, methods and theoretical concepts to execute research or design projects related to practical applications of MEMS/NEMS technology. | After the completion of this course the student will be able to;<br>CO1 Understand the basic concepts and principles of nano technology<br>CO2 Understand the physics and chemical concepts useful for developing NEMS systems<br>CO3 Apply the principles for the design and optimize the nano and microstructures<br>CO4 Assess the micro and nano scale systems and devices through modeling<br>CO5 Design and develop carbon based nano electronic systems.<br>CO6 Skills of both Mechanical and Electronics at nano level are developed by the students after completion fo the course.<br>CO7 With these skills the students are highly employable in the area of Mechatronics Industries. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 861 | IFHE235 | Neural Computation | MEC 412 | B.Tech in Mechatronics | FST (IcfaiTech) | This course provides an introduction to theories of neural computation, with an emphasis on the visual system. The goal is to familiarize students with the major theoretical frameworks and models used in neuroscience and psychology, and to provide hands-on experience in using these models | Upon successful completion of the course, student will be able to:<br>CO1 Understand the fundamental techniques and principles of neural computation.<br>CO2 Investigate some common neural-based models and their applications.<br>CO3 Present neural network models in the context of automated learning.<br>CO4 With the skills of computational and numerical understanding of solving the problems helps the students apply them in the applications of various domain functionalities.<br>CO5 With these skills the students are highly chances of getting employed in the R&D Centers and many research institutes. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 862 | IFHE235 | Numerical Methods | MECAO311 | B.Tech in Mechatronics | FST (IcfaiTech) | Enables one to devise algorithms for the numerical solutions of mathematical problems. Applications to problems from Engineering areincluded for each method. | • To solve nonlinear equations by standard methods.<br>• To solve Linear equations by Gauss-Seidel and other methods.<br>• To perform Matrix inversion by Gauss-Jordan method.<br>• To do Numerical differentiation and integration by standard methods.<br>• To solve ODEs numerically by standard methods.<br>• To apply software packages to solve above problems. | 20% | 35% | 10% | 35% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 863 | IFHE235 | Optimization Techniques | MECAO225 | B.Tech in Mechatronics | FST (IcfaiTech) | • Introduction to optimization techniques using both linear and non-linear programming.<br>• Students will learn to frame minima maxima problems in the framework of optimization problems. | • Cast minima/maxima problems into optimization framework.<br>• Learn efficient computational procedures to solve optimization problems. | 20% | 35% | 10% | 35% | 100.00% |
| 864 | IFHE235 | Physics II | MECPHY124 | B.Tech in Mechatronics | FST (IcfaiTech) | Develop an understanding of the basic principles of electromagnetism and the application of the principles with emphasis on problem solving skills. | • Understand the main concepts of electromagnetic theory<br>• Develop the mathematical framework to explore electricity and magnetism<br>• Apply the mathematical framework quantitatively for solving relevant problems<br>• Appreciate qualitatively how they play a role in many aspects of daily life. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, [illegible])

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 865 | IFHE235 | Physics I | MECPHY114 | B.Tech in Mechatronics | FST (IcfaiTech) | Develop an understanding of the basic principles of Mechanics and wave optics and the application of the principles with emphasis on problem solving skills. | • Apply conservation of linear momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply conservation of angular momentum to two/many body systems in lab and centre of mass frame of reference.<br>• Apply the conservation of energy principle and find the work done by a body under the influence of conservative/non-conservative forces.<br>• Understand the types of oscillations/waves and the fundamental equations governing them.<br>• Understand the physics of the most important phenomena in wave optics, namely, interference, diffraction. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 866 | IFHE235 | Principles of Economics | MECECON214 | B.Tech in Mechatronics | FST (IcfaiTech) | To gain an understanding of core economic principles and how they apply to a wide range of real-world issues.<br>To master the theoretical and applied tools necessary to critique and create economic research.<br>To learn how to articulate pragmatic, principles-based policies to enhance economic well-being and promote social justice.<br>To become familiar with salient developments in the world economy, in both present-day and historical contexts. | Upon successful completion of the course, student will be able to:<br>CO1-Describe and explain how microeconomic models can be used to consider fundamental economic choices of households and firms.<br>CO2-Describe and explain how macroeconomic models can be used to analyse the economy as a whole.<br>CO3- Describe and explain how government policy influences microeconomic choices and macroeconomic outcomes.<br>CO4-Interpret and use economic models, diagrams and tables and use them to analyse economic situations. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 867 | IFHE235 | Principles of Management | MECMGTS224 | B.Tech in Mechatronics | FST (IcfaiTech) | To enable the students to study the evolution of Management,<br>To study the functions and principles of management.<br>To learn the application of the principles in an organization.<br>To enable the effective and barriers communication in the organization<br>To study the system and process of effective controlling in the organization. | Upon successful completion of the course, student will be able to:<br>CO1: Understand the concepts related to Business.<br>CO2: Demonstrate the roles, skills and functions of management.<br>CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.<br>CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 868 | IFHE235 | Probability and Statistics | MECAO122 | B.Tech in Mechatronics | FST (IcfaiTech) | • This course introduces the concept of probability and enables the student to become familiar with probabilistic concepts,<br>• A selected study of discrete & continuous distributions and their characteristics | • Calculate probabilities and other relevant quantities by selecting suitable probability distributions.<br>• Work with certain multivariate distributions and derive marginal and conditional probability distributions. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 869 | IFHE235 | Professional Communication | MECTA223 | B.Tech in Mechatronics | FST (IcfaiTech) | The course aims at acquiring the students<br>• to understand various aspects of business communication.<br>• to gain knowledge regarding the various ways of assembling information,<br>• to write clearly and concisely and to present information in an effective manner<br>• to train them for oral presentation. | • Understand the aspects of verbal and non verbal communication in its significane in professional and personal communication<br>• Utilize their knowledge of report writing and write appropriate technical reports.<br>• Make oral presentations<br>• Distinguish between various busniness communicational formats and use them appropriately. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |
| 870 | IFHE235 | Protein Kinematics | MEC 411 | B.Tech in Mechatronics | FST (IcfaiTech) | In the course we shall discuss the physical principles that control the kinetic and the equilibrium properties of proteins from the perspective of statistical mechanics. | Upon successful completion of the course, student will be able to:<br>CO1 describe the different levels of protein structure and their interdependence<br>CO2 explain how steric limitations determine secondary structure in polypeptides<br>CO3 Able to describe, using examples, the relationship between protein structure and function<br>CO4 Understanding the significance of domains in protein function and how they have arisen.<br>CO5 With these skills the students can apply the study of various bonds, culture of proteins. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 871 | IFHE235 | Scientific Measurements | MECTA125 | B.Tech in Mechatronics | FST (IcfaiTech) | 1. To learn techniques involved in analyzing measurement data and the errors associated with the measurement system used<br>2. To learn ways to measure physical quantities: force, strain, temperature, rotational frequency, power, flow and pressure.<br>3. To increase proficiency in report writing, particularly in the area of graphical presentation of data.<br>4. To be able to use data acquisition software and hardware to collect and analyze acquired data. | Upon successful completion of the course student will be able to:<br>Measure calibration errors in instruments<br>Measure Area of a given curve<br>Choose the graph format for any given curve: Can draw Semi-Log Graph.<br>Operate and understanding the operation of pressure, flow, temperature, strain & stress measuring instruments | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

S Vijayapal

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 872 | IFHE235 | Smart Materials | MEC 422 | B.Tech in Mechatronics | FST (IcfaiTech) | Identify the properties of smart materials that can be valuable in a specific area of application.<br><br>Apply theoretical and experimental approaches to designing, fabricating, and tuning properties of selected solid state and soft matter materials.<br><br>Utilize the potential of lab on chip technologies for materials science applications. | CO1. Have knowledge about smart materials.<br>CO2. Selection of proper smart material for the proper engineering application.<br>CO3. Able to design necessary smart structures to control the behavior of the structure.<br>CO4. Able to use the Smart Structures and Intelligent System are becoming an integral part of new aerospace and automobile systems due to high performance and fast response potential.<br>CO5. Knowledge in this field is multidisciplinary in nature involving materials, composites, basic electronics, control system and informatics.<br>CO6. Skills with multi-disciplinary study helps in getting high chances of employable in the areas of Material Science with deep approach towards the analysis and design of various material structures. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 873 | IFHE235 | Soft Robotics | MEC 413 | B.Tech in Mechatronics | FST (IcfaiTech) | Design, compose, construct, and evaluate soft robotics prototypes for specific tasks. Test and analyze the performance of soft robotic elements and interpret the results. Fabricate functioning soft robotic devices made of compliant materials. | Upon successful completion of the course, student will be able to:<br>CO1 Describe open questions in soft robotics by way of literature review.<br>CO2 Develop a research plan and methodology for a soft robot project.<br>CO3 Produce novel soft robotic systems.<br>CO4 Students are capable of completely developing the robotics systems with their unique approach after completion of the course.<br>CO5 The students are capable of getting employed in the domain area of the Robotics. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 874 | IFHE235 | Structure & Properties of Materials | MECES226 | B.Tech in Mechatronics | FST (IcfaiTech) | • The course is interdisciplinary in nature, predominantly covering the fields of physics, chemistry, mechanical and metallurgical engineering<br>• The course is offered to students of all branches of engineering, and provides an excellent understanding of the structure of materials at the atomic and microscopic level<br>• The main objective is to show how the type of bonding and crystal structure affects properties of metallic, ceramic, electronic and polymeric materials<br>• The course aims at to establish correlation between processing/Structure/Performance of materials of importance and shed light on interesting materials and their applications | Upon successful completion of the course, student will be able to:<br>• Identify bonding in different material types; describe the lattice structure of materials; describe the lattice parameters for 7 crystal systems; specify the Miller indices for the planes in a unit cell of metals, ceramics and polymers. Define isotropy and anisotropy w.r.t. material properties; describe various types of defects and dislocations and interpret atomic structure within the vicinity of grain and twin boundaries.<br>• Describe the atomic mechanisms of diffusion in metallic, ionic and polymeric materials; distinguish between steady state and non-steady state diffusions; Explain the factors that affect the rate of diffusion; define slip systems and its relation to mechanical properties; Define stress, strain, state Hook's law, Poisson's ratio; Discuss various mechanical properties like strength, toughness, resilience and hardness<br>• Describe the process used to produce glass-ceramics; describe structure, composition of different types of ionic, covalent ceramics viz. cements, refractories, clay products, abrasives. Compute the flexural strength of ceramics by | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 875 | IFHE235 | Surgical Robots | MEC418 | B.Tech in Mechatronics | FST (IcfaiTech) | Defining robotic surgical platform components, features, setup requirements, and troubleshooting measures.<br>Developing the psychomotor skills required to safely operate robotic surgical platforms.<br>Demonstrating how robotic surgical platforms are integrated into the operating room setting and how platforms can be best utilized in clinical practice.<br>Developing clinical efficiency through comprehensive team training. | Upon successful completion of the course, student will be able to:<br>CO1 Identify and describe different types of medical robots and their potential applications.<br>CO2 Understand the various roles that robotics can play in healthcare.<br>CO3 Design and implement robotic assistance for both minimally invasive surgery and image-guided interventions.<br>CO4 Advanced skills pertaining to robotics helps the students to get employed into the various medical robots manufacturing and development industries. | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 876 | IFHE235 | Technology Innovation Project | TIP 491 | B.Tech in Mechatronics | FST (IcfaiTech) | A unique opportunity for the students in the form of a course that facilitate the combination of academics with the industry by involving an in-depth innovation, investigation under the supervision of mentor from Industry and a faculty member for performing the real-life projects with the support from various organizations. Students working in groups will be required to perform research, customer and problem discovery, ideation, concept creation and validation, and technical implementation for a real-world challenge. The specific time-bound based on the students registered for the course will be graded based on the performance feedback from both the industry and the Faculty supervisor. The student will be able to improve the skills and knowledge for improving written and oral communication with indicative content which includes innovation methodology, customer & problem discovery, problem validation, innovation experiments with innovative presentations. | After successful completion of the course student will be able to<br>1. Work independently as part of an interdisciplinary team to complete a technical innovation project<br>2. Collect and critically analyse a range of data about the project allotted by creating innovation hypotheses from the data<br>3. Validate innovation hypotheses<br>4. Conceptualize, design, and implement an innovative and technology-based solution to the identified problem Present technical solutions to various stakeholders in both written and oral forms | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 877 | IFHE235 | Thermodynamics | MECES121 | B.Tech in Mechatronics | FST (IcfaiTech) | • To study the properties of pure substances and their use in widely used devices such as steam power plant, fuel cells, refrigerator, Turbine and Pumps.<br>• To know how to use the thermodynamic tables to identify the phase of a given state of matter and estimate the quality of saturated liquid vapor mixture<br>• To understand the concept of heat and work and estimate the same at the boundary of real time systems<br>• To know the application of first law for closed systems and the interpretation of thermodynamic properties such as Internal Energy and Enthalpy and determine their change during a process; To know the application of first law for control volume systems and to understand the transient process<br>• To know the application of second law of thermodynamics and to know the thermodynamic temperature scale; To understand the concept of entropy and entropy change in solid, liquid and liquids and gases<br>• To delimit the application of second law for control volume systems and to understand the concept of efficiency of engines | • Identify and explain the basic concepts of thermodynamics like system, properties and their quantification<br>• Calculate thermodynamic properties using steam tables and analyze the processes on T-v diagrams to solve advanced engineering problems<br>• Explain the concept of thermodynamic work. Calculate and compare work for systems executing different thermodynamic processes or different thermodynamic cycles<br>• State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components<br>• Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems<br>• Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property, entropy of a system. Apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process | 20.00% | 35.00% | 10.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 878 | IFHE235 | Thesis & Seminar | TS401 | B.Tech in Mechatronics | FST (IcfaiTech) | This course TS 401 is a must for all students with Thesis option for the eligibility of degree. This course involves research work in an active area to satisfy the creative urge in a student and may involve advanced study learning and experimentation. This work may form the basis for dissertation of a higher degree. Also this requires fulltime work from the student for a complete semester and must co-terminate with thesis report. | After successful completion of the course student will be able to<br>1. Independently acquire and handle knowledge through independent studies of relevant literature<br>2. Idependently identify and analyze relevant problems and solve a problem by a systematic use of an appropriate choice of theory and methodologies | 30% | 30% | 20% | 20% | 100.00% |
| 879 | IFHE235 | Tissue Modelling | MEC 415 | B.Tech in Mechatronics | FST (IcfaiTech) | Teach students basic ideas of the weak formulation for mechanics .<br>Teach students hands on approaches to finite element modeling of biological tissues<br>Teach students concepts of scale hierarchy in tissues and the use of homogenization theory for multiscale modeling<br>Teach students mechanical theories of tissue adaptation and<br>Teach students how to apply mechanics and modeling in design of tissue engineering systems | After learning the course the students should be able to:<br>CO1 Build on a basic understanding of tissue engineering to develop a more in-depth level of understanding that will enable engineering analysis of selected biomedical systems.<br>CO2 Be able to apply engineering principles in designing tissue for biomedical problems.<br>CO3 Be able to translate the understanding of thermophysical properties function of materials into a tissue engineering model based on analysis of a biomedical system.<br>CO4 Diversified approach of multidisciplinary skills for the students helps to get employable into the fields of Biomedical and Biotechnology | 5.00% | 35.00% | 5.00% | 55.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 880 | IFHE235 | Unmanned Aerial Vehicles | MEC 407 | B.Tech in Mechatronics | FST (IcfaiTech) | The course objectives include: knowledge about various aircraft and payloads, the geodetic control creation, flights planning and their implementation, the main stages of data processing and application of the results obtained. | Upon successful completion of the course, student will be able to<br>CO1. Understand and operate typical civilian low cost unmanned aerial vehicles.<br>CO2. Integrate typical mission sensors in civilian low cost unmanned aerial vehicles.<br>CO3. Get ready to create UAV related engineering practice/service or to join UAV work force.<br>CO4. Skills in practically inventing the UAV with the content covered and employability is high as the future is turning towards it. | 30.00% | 40.00% | 10.00% | 20.00% | 100.00% |
| 881 | IFHE235 | Workshop Practice | MECTA126 | B.Tech in Mechatronics | FST (IcfaiTech) | 1. To learn how the physical artifacts we use are manufactured and gain technical knowledge and skills.<br>2. The practical knowledge is supplemented by the lectures to provide the knowledge and genesis of various manufacturing processes.<br>3. To check the dimensional tolerances of machined components and acquire knowledge of handling basic machine tools for different applications.<br>4. To develop skills required for machining components by advanced manufacturing methods like CNC programming.<br>5. To analyse the difference between conventional and non-conventional manufacturing processes. | • The course will provide an overview of the techniques and applications of basic manufacturing processes used for producing finished articles from raw materials.<br>• The course is practice-orientated and requires that basic skills in handling of tools, machines and machine tools used in different manufacturing processes are acquired through the hands-on experience.<br>• Much of the knowledge in the course is conceptual and this knowledge will be useful in whatever discipline the students are going to specialize. | 30.00% | 25.00% | 20.00% | 00.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 882 | IFHE 221 | Advances Topics in Manufacturing System Engineering | MSE 617 | M.Tech - MSE | FST (IcfaiTech) | 1 Discuss the theory, concepts and principles of manufacturing engineering and quality systems;<br>2 Analyse a range of seminal articles and key reference materials underpinning the discipline;<br>3 Develop range of isues and problems; and<br>4 Demonstrate the ability to work independently and as an effective member of a team in order to apply their acquired knowledge and skills to both theoretical and practical problems. | Upon successful completion of the course student will be able to:<br><br>CO1 Students will be able to categorize different material removal, joining processes as per the requirements of material being used to manufacture end product.<br>CO2 Students will be able to select material processing technique with the aim of cost reduction, reducing material wastage & machining time.<br>CO3 Students will be able to identify the process parameters affecting the product quality in various advanced machining of metals/ non-metals, ceramics and composites.<br>CO4 Students will be able to combine & develop novel hybrid techniques from the state of art techniques available.<br>CO5 Students will be able to perform process analysis taking into account the various responses considered in a process. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 883 | IFHE 221 | Advances in Industrial Systems Engineering | MSE 601 | M.Tech - MSE | FST (IcfaiTech) | This course combines engineering with management practice, giving you a strong grounding for a career in industry. Core modules cover the fundamental and advanced concepts of modelling, simulation, control, optimisation and systems engineering. You'll also learn a range of management techniques, including: project management, risk management, professional skills and effective management of innovative development. | Upon successful completion of the course student will be able to:<br>CO1. Provide students with the requisite knowledge and skills that enable them to design, install and manage large integrated engineering and service systems.<br>CO2. Provide students with analytical skills that allow them to evaluate and improve large integrated engineering and service systems.<br>CO3. Provide students access to modern engineering tools that enable them to solve complex industrial and systems engineering problems. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 884 | IFHE 221 | Advances in Manufacturing Technology | MSE 610 | M.Tech - MSE | FST (IcfaiTech) | | CO1 Students will be able to categorize different material removal, joining processes as per the requirements of material being used to manufacture end product.<br>CO2 Students will be able to select material processing technique with the aim of cost reduction, reducing material wastage & machining time.<br>CO3 Students will be able to identify the process parameters affecting the product quality in various advanced machining of metals/ non-metals, ceramics and composites.<br>CO4 Students will be able to combine & develop novel hybrid techniques from the state of art techniques available.<br>CO5 Students will be able to perform process analysis taking into account the various responses considered in a process. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD INDIA

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 885 | IFHE 221 | Advances in Optimization Techniques | MSE 616 | M.Tech - MSE | FST (IcfaiTech) | Apply now | Upon successful completion of the course student will be able to:<br>CO1 Students will be able to categorize different material removal, joining processes as per the requirements of material being used to manufacture end product.<br>CO2 Students will be able to select material processing technique with the aim of cost reduction, reducing material wastage & machining time.<br>CO3 Students will be able to identify the process parameters affecting the product quality in various advanced machining of metals/ non-metals, ceramics and composites.<br>CO4 Students will be able to combine & develop novel hybrid techniques from the state of art techniques available.<br>CO5 Students will be able to perform process analysis taking into account the various responses considered in a process. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 886 | IFHE 221 | Advances in Production and Inventory Control | MSE 608 | M.Tech - MSE | FST (IcfaiTech) | Operations management is an area of management concerned with designing and controlling the process of production and redesigning business operations in the production of goods or services. Operation management covers sectors like banking systems, hospitals, companies, working with suppliers, customers, and using technology. Operations is one of the major functions in an organization along with supply chains, marketing, finance and human resources. | Upon successful completion of the course student will be able to:<br>CO1. The elements, processes, and technologies comprising the field of Manufacturing Planning and Control (MPC)<br>CO2. Demand management theories and techniques – forecasting, CPFR<br>CO3 Sales and Operations Planning process in the firm Enterprise Resource Planning (ERP) – How MPS decisions are supported by ERP<br>CO4 Supply chain inventory management – independent demand items<br>CO5 Using a Material Requirement Planning system, Distribution Requirements Planning in the Supply Chain – Using DRP technologies<br>CO6 Inventory flow and planning models – JIT, MRP, etc. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Tofal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 887 | IFHE 221 | Applied Statistics and Probability | MSE 504 | M.Tech - MSE | FST (IcfaiTech) | This course aims to provide an understanding of the basic concepts in probability, conditional probability and independent events. It will also focus on the random variable, mathematical expectation, and different types of distributions, sampling theory and estimation theory. Another objective of the course is to design a statistical hypothesis about the real world problem and conduct appropriate test for drawing valid inference about the population characteristics. It is inevitable to have the knowledge of hypothesis testing for any research work. The course will provide an opportunity to learn R programming to substantial extent. | Upon successful completion of the course student will be able to:<br><br>CO1: Recognize common probability distributions for discrete and continuous variables.<br>CO2: Apply methods from algebra and calculus to derive the mean and variance for a range of probability distributions.<br>CO3: Calculate probabilities relevant to multivariate distributions, including marginal and conditional probabilities and the covariance of two random variables.<br>CO4: Understand the concept of convergence, common methods for evaluating an inequalities performance and properties of desirable estimators.<br>CO5 Understand the central limit theorem and large-sample approximations for common statistics. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 888 | IFHE 221 | Automation in Manufacturing | MSE 604 | M.Tech - MSE | FST (IcfaiTech) | Acquire the fundamental concepts of automated flow lines and their analysis. Classify automated material handling, automated storage and retrieval systems. Illustrate adaptive control systems and automated inspection methods | Upon successful completion of the course student will be able to:<br>CO1. Illustrate the basic concepts of automation in machine tools.<br>CO2. Analyze various automated flow lines, Explain assembly systems and line balancing methods.<br>CO3. Describe the importance of automated material handling and storage systems.<br>CO4. Interpret the importance of adaptive control systems, automated inspection systems. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 889 | IFHE 221 | Computer Based Simulation Methods & Applications | MSE 506 | M.Tech - MSE | FST (IcfaiTech) | Introduce computer simulation technologies and techniques, provides the foundations for the student to understand computer simulation needs, and to implement and test a variety of simulation and data analysis libraries and programs. This course focusses what is needed to build simulation software environments, and not just building simulations using preexisting packages.<br>Introduce concepts of modeling layers of society's critical infrastructure networks.<br>Build tools to view and control simulations and their results. | Define the basics of simulation modeling and replicating the practical situations in organizations<br>Generate random numbers and random variates using different techniques.<br>Develop simulation model using heuristic methods. Analysis of Simulation models using input analyzer, and output analyzer.<br>Explain Verification and Validation of simulation model. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 890 | IFHE 221 | Engineering Economy | MSE 503 | M.Tech - MSE | FST (IcfaiTech) | The objective of this course is to teach the concepts of engineering economic analysis and its role in solving problems. It is designed to provide engineers with the tools needed for rigorous presentation of the effect of the time value of money on engineering decision making | Upon successful completion of the course student will be able to:<br>1. Define, estimate and analyse engineering project costs<br>2. Develop, evaluate, and compare engineering project cash flows<br>3. Develop and apply mathematical models describing real life cash flows and time value of money<br>4. Formulate and apply interest factors to real life engineering problems<br>5. Evaluate engineering alternatives by economic analysis techniques and models | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 891 | IFHE 221 | Facilities Planning & Material Handling | MSE 508 | M.Tech - MSE | FST (IcfaiTech) | The main objective of this course is to enable the students to be trained with planning/production and plant layouts, studying about strategies of material handling and equipments, and selection of site locations. It also aims to explore the layout planning by computer applications following different algorithms. | Upon successful completion of the course student will be able to:<br>CO1. Select appropriate location for establishing industrial plants by applying the concepts of location selection.<br>CO2. Plan and design plant and production layouts through basic strategies and with computer applications.<br>CO3. Identify and analyse the problems in the existing layout/ material handling system and shall be able to the optimize the layout/ material handling system<br>CO4. Develop algorithms for new planning layouts for typical applications in the industries and Suggesting appropriate material handling strategies in the industries. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 892 | IFHE 221 | Flexible Manufacturing Systems | MSE 602 | M.Tech - MSE | FST (IcfaiTech) | At the end of this course, students will be able to:<br>• Understand the role of Flexible Manufacturing Systems(FMS) in manufacturing,<br>• Understand the concept of Group Technology<br>• Understand the concept of Cellular Mfg Systems<br>• Understand the benefits of automation,<br>• Know types of manufacturing industries,<br>• Be familiar with organization and information processing in manufacturing,<br>• Have a basic knowledge of automation equipment,<br>• Understand logic control and associated technologies | Upon successful completion of the course student will be able to:<br>CO1: Apply the concepts of PPC and GT to the development of FMS.<br>CO2: Discuss the planning and scheduling methods used in manufacturing systems.<br>CO3: Identify various workstations, system support equipments.<br>CO4: Identify hardware and software components of FMS.<br>CO5: Summarize the concepts of modern manufacturing such as JIT, supply chain management and lean manufacturing etc. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 893 | IFHE 221 | Industrial Robotics | MSE 603 | M.Tech - MSE | FST (IcfaiTech) | To understand the basic concepts associated with the design and Functioning and applications of Robots<br>To study about the drives and sensors used in Robots<br>To learn about analyzing robot kinematics and robot programming | Upon successful completion of the course, student will be able to:<br>CO1. Design a simple path and motion planning robot.<br>CO2. Elucidate and design the applications of SLAM<br>CO3. Illustrate the function of application specific Tasks of Mobile Robots.<br>CO4. Skills of implementing and understanding of various algorithms in guiding the robotics is covered through this content.<br>CO5. Employability is high as the customization of the robotics need to be addressed as per the future requirements and can be studied through this content. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 894 | IFHE 221 | Intelligent Manufacturing Systems | MSE 609 | M.Tech - MSE | FST (IcfaiTech) | This course provides an overview of manufacturing systems from product design to facility planning, processes, production systems, and quality control techniques. The role of smart technologies, like data analytics, cloud computing and automation in reshaping manufacturing engineering is emphasized. Course content is reinforced through labs and case studies. | The student will gain the knowledge and skills to<br>1. assess the performance of manufacturing systems<br>2. develop a systematic approach for design and implementation of manufacturing systems<br>3. suggest new procedures to improve the productivity of existing manufacturing systems<br>4. utilise online collaboration tools to work in complex teams | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 895 | IFHE 221 | Manufacturing Processes | MSE 502 | M.Tech - MSE | FST (IcfaiTech) | The main objective of this course is to emphasize the importance manufacturing sciences in the day-to-day life, and to study the basic manufacturing processes and tools used. The course is delineated particularly to understand the conventional manufacturing processes like casting, metal forming, and welding process. | Upon successful completion of the course student will be able to:<br>CO1. Give students the information in materials processing such as casting, forming, machining, welding,<br>CO2. Introduce the principles of basic materials processes; tools and machines used; application fields of different processes in manufacturing<br>CO3. Develop an understanding of environmental and design issues related to the processes in manufacturing | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 896 | IFHE 221 | Manufacturing Strategy | MSE 605 | M.Tech - MSE | FST (IcfaiTech) | 1. To develop a managerial point of view — a capacity for analyzing operating problems on a functional,<br>a business, and a company-wide basis.<br>2. To develop an understanding of the "state of the art" of strategic management thinking as it applies to<br>manufacturing firms.<br>3. To integrate the knowledge gained in other courses and to extend that in the area of manufacturing and<br>operations, particularly with regard to the job of the general manager and the operating function.<br>4. To develop an awareness of the organizational structures and procedures used in manufacturing firms and<br>their strengths and weaknesses.<br>5. To suggest the range of general management issues that you should consider in handling individual<br>manufacturing decisions with a strategic point of view.<br>6. To develop habits of orderly thinking and rigor in formulating, evaluating, and recommending changes in<br>manufacturing strategy. | Upon successful completion of the course student will be able to:<br><br>CO1. relate manufacturing strategy as guidance for the organization's manufacturing activities;<br>CO2. appraise manufacturing processes, applying a number of organizing theories, frameworks and analytical devices used by companies;<br>CO3. assess the impact of manufacturing on sustainability and how manufacturing can contribute to a sustainable society;<br>CO4. explain a number of conceptual tools for enhancing the performance of manufacturing processes;<br>CO5. adapt these tools to the analysis of manufacturing processes;<br>CO6. interpret the different production contexts and explain when and how it is appropriate to apply these different tools. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 897 | IFHE 221 | Micro Electronic Mechanical Systems | MSE 615 | M.Tech - MSE | FST (IcfaiTech) | Students will be able to explain micro sensors, micro-actuators, their types and applications. Students will be able to explain about fabrication processes for producing micro-sensors and actuators. They will also be able to apply Reliability, and Failure Analysis Testing. | Upon successful completion of the course student will be able to:<br>CO1. Understand the basic principles of operation of micro devices, micro systems and their applications.<br>CO2. Select suitable sensors for different applications of MEMS.<br>CO3. Design the micro devices, micro systems using the MEMS fabrication process.<br>CO4. Apply the concepts for manufacture of polymer and BioMEMS systems | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 898 | IFHE 221 | Optimization Methods & Their Applications | MSE 505 | M.Tech - MSE | FST (IcfaiTech) | □ Enumerate the fundamental knowledge of Linear Programming and Dynamic Programming problems.<br>□ Learn classical optimization techniques and numerical methods of optimization.<br>□ Know the basics of different evolutionary algorithms.<br>□ Explain Integer programming techniques and apply different optimization techniques to solve various models arising from engineering areas. | CO1 Enumerate the fundamental knowledge of Linear Programming and Dynamic Programming problems.<br>CO2 Learn classical optimization techniques and numerical methods of optimization.<br>CO3 Know the basics of different evolutionary algorithms.<br>CO4 Explain Integer programming techniques and apply different optimization techniques to solve various models arising from engineering areas. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 899 | IFHE 221 | Product Design & Development | MSE 612 | M.Tech - MSE | FST (IcfaiTech) | The main objective of the course is to acquaint the learners/students with the practical knowledge regarding conceptualization, design and development of a new product. ... The concept of Ergonomics in context of the product design has been explained with the help of case studies. | Upon successful completion of the course student will be able to:<br>CO1. Describe an engineering design and development process<br>CO2. Create 3D solid models of mechanical components using CAD software<br>CO3. Demonstrate individual skill using selected manufacturing techniques, including drilling, pressing, tapping, and rapid prototyping<br>CO4. Employ engineering, scientific, and mathematical principles to execute a design from concept to finished product<br>CO5. Fabricate an electromechanical assembly from engineering drawings<br>CO6. Work collaboratively on a team to successfully complete a design project<br>CO7. Effectively communicate the results of projects and other assignments in a written and oral format | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 900 | IFHE 221 | Project Management | MSE 607 | M.Tech - MSE | FST (IcfaiTech) | Assumes responsibility as a professional practitioner of project management, applying PM principles and practices while maintaining high standards of practice, making ethical judgments and decisions in a respectful, and sustaining professional standing through a commitment to life-long learning<br>Demonstrates effective use of written, verbal , and non-verbal communication, uses industry terminology, writes a variety of Project Management documents and plans, applies processes required to manage the communications of a project (including appropriate and timely management of project information), and uses technology appropriate to the task<br>Practices interpersonal skills to manage the human resources of a project including organizing, managing and leading the project team, using effective strategies to influence others, manage conflict, and leads teams to successful project completion<br>Values and is committed to the roles and influence of the project manager, sponsor, and customer | Upon successful completion of the course student will be able to:<br>CO1.Understand project characteristics and various stages of a project.<br>CO2. Understand the conceptual clarity about project organization and feasibility analyses – Market, Technical, Financial and Economic.<br>CO3. Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.<br>CO4. Apply the risk management plan and analyse the role of stakeholders.<br>CO5. Understand the contract management, Project Procurement, Service level Agreements and productivity. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 901 | IFHE 221 | Quality Engineering & Management | MSE 507 | M.Tech - MSE | FST (IcfaiTech) | To understand the concept of Quality<br>To understand the Implication of Quality on Business<br>To Implement Quality Implementation Programs<br>To have exposure to challenges in Quality Improvement Programs | Upon successful completion of the course student will be able to:<br>CO1. Attain the basic techniques of quality improvement, fundamental knowledge of statistics and probability<br>CO2. Use control charts to analyze for improving the process quality.<br>CO3. Describe different sampling plans<br>CO4. Acquire basic knowledge of total quality management 5. Understand the concepts of reliability and maintainability | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 902 | IFHE 221 | Reliability Engineering & Management | MSE 618 | M.Tech - MSE | FST (IcfaiTech) | To apply engineering knowledge and specialist techniques to prevent or reduce the likelihood or frequency of failure<br>To identify and correct the causes of failures that do occur, despite of the efforts to prevent them to optimize the reliability of equipment and infrastructure<br>to carry out prompt emergency repair of equipment and infrastructure so as to secure the best possible availability for production | Upon successful completion of the course student will be able to:<br><br>CO1 The students will be able to use statistical tools to characterise the reliability of an item and determine the reliability of a system, and will also understand the application of maintenance strategies in a manufacturing environment;<br><br>CO2 The students will be able to establish maintenance strategies according to system characteristics and design transition programs to implement these strategies.<br><br>CO3 The students will develop ability in formulating suitable maintenance strategies to enhance system reliability of a manufacturing system<br><br>CO4 Student will be able to apply concepts of TPM, RCM, & FMECA in managing the manufacturing organisation with highest possible levels of reliability/ availability. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 903 | IFHE 221 | Supply Chain Management | MSE 606 | M.Tech - MSE | FST (IcfaiTech) | 1. To understand how Logistics, Supply Chain, Operations, Channels of Distribution fit in to various types of Business viz., Manufacturing, Service and Project. 2. To understand how Warehouse Management and, other functions in Logistics fits into Logistics & Supply Chain Management. | Upon successful completion of the course student will be able to:<br>CO1. Define and establish the strategic importance of logistics to achieve business success by creating value through supply chains.<br>CO2. Analyzing, comparing and interpreting the combination of customer accommodation, market distribution, procurement, and manufacturing represents the supply chain areas that are linked and supported by logistics and lean management.<br>CO3. Estimate and evaluate the concept of operational integration and global supply chain integration.<br>CO4. Discuss models for integrative logistics and supply chain in a theoretical framework. Recognize how structure provides the basis for increasing the capacity of the supply chain. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 904 | IFHE 221 | Sustainable Manufacturing Systems | MSE 611 | M.Tech - MSE | FST (IcfaiTech) | Department of Commerce, is "the creation of manufactured products that use processes that minimize negative environmental impacts, conserve energy and natural resources, are safe for employees, communities, and consumers and are economically sound." Even though this definition exists, sustainable manufacturing still has many meanings in many contexts, industries, and forums. This course is designed to introduce the fundamental concepts of sustainable manufacturing. Students will learn these fundamentals through textbook reading, homework assignment, classroom case study discussions, projects, presentations, and guest speakers. While the focus of the course will be on sustainable manufacturing, the course will also look at the connections of sustainable design, environmental sciences, and the social sciences with sustainable manufacturing | Upon successful completion of the course student will be able to:<br>CO1 compare and evaluate alternative manufacturing processes in terms of energy and materials consumption;<br>CO2 develop a new product addressing sustainability issues;<br>CO3 describe pros and cons of alternative manufacturing systems and supply chains on sustainability;<br>CO4 compare and evaluate alternative energy sources to manufacture a product;<br>CO5 conduct a life cycle assessment (LCA) on a product;<br>CO6 function better in a multi-disciplinary team;<br>CO7 adopt a new behaviour to address sustainability issues. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 905 | IFHE 221 | Technology Management | MSE 613 | M.Tech - MSE | FST (IcfaiTech) | Demonstrate the ability to understand, analyze, and improve organizational practices through the use of current technology, analysis, and design to address evolving business and customer needs. Outcomes: Apply measurement and analytical tools to improve process systems. | Upon successful completion of the course student will be able to:<br>(1) To assess the range, scope, and complexity of the phenomena, issues, and problems related to technology management;<br>(2) To discuss various problems where particular managerial decisions need to be taken such as technology acquisition and transfer;<br>(3) To use a range of tools used in technology creation, search, assessment, selection, implementation, utilization, and strategy;<br>(4) To describe the primary tasks and decisions that are required to turn a technological innovation into a sound business opportunity;<br>(5) To assess how to integrate engineering and business knowledge in running business successfully. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

S Upagopalan

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 906 | IFHE 221 | Unified Approach to Manufacturing Systems Engineering | MSE 501 | M.Tech - MSE | FST (IcfaiTech) | Demonstrate the ability to understand, analyze, and improve organizational practices through the use of current technology, analysis, and design to address evolving business and customer needs. Outcomes: Apply measurement and analytical tools to improve process systems. | Upon successful completion of the course student will be able to:<br><br>CO1. Independently carry out time study, method study and construct control charts CO2. Able to apply commercial system simulation software packages to manufacturing systems. CO3. Apply commercial statistical analysis software packages to manufacturing systems. | 10.00% | 40.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 907 | IFHE 221 | Venture Management | MSE 614 | M.Tech - MSE | FST (IcfaiTech) | 1. Generate ideas to solve a business problem and address a customer need<br><br>2. Validate your business idea<br><br>3. Pitch your business to attract funding<br><br>4. Work as a team to commercialize your business idea | Upon successful completion of the course student will be able to:<br>CO1- Identify and systematically evaluate opportunities to design new organisations that solve problems or make lives better and, therefore, are likely to attract customers<br>CO2- Identify and synthesize sources of additional information, education, and advice for new organizations.<br>CO3-Present a convincing business description to communicate the value the new venture provides to customers, investors and other stakeholders.<br>CO3-Articulate which business metrics matter and how you expect to perform according to them.<br>CO4- Present a convincing business pitch to communicate the value the new venture provides to customers, investors and other stakeholders.<br>CO5-Articulate which business metrics matter and how you expect to perform according to them | 30.00% | 30.00% | 10.00% | 30.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 908 | | Digital Signal Processing | | | | To make students familiar with the most important methods in DSP, including digital filter design, transform-domain processing and importance of Signal Processors. To make students aware about the meaning and implications of the properties of systems and signals | Upon successful completion of the course, the students will be able to :<br><br>1: Understand, characterize & analyze discrete-time signals and systems in time domain.<br>2: Analyze discrete-time signals and LTI discrete-time systems in transform domain.<br>3: Design and implement FIR and IIR digital filters using different methods.<br>4. Develop the skills needed for research in the signal processing field. | | | | | |
| 909 | IFHE 220 | Digital VLSI Design | EC 502 | M.Tech - VLSI | FST (IcfaiTech) | Be able to use mathematical methods and circuit analysis models in analysis of CMOS digital electronics circuits, including logic components and their interconnect.<br>2. Be able to create models of moderately sized CMOS circuits that realize specified digital functions.<br>3. Be able to apply CMOS technology-specific layout rules in the placement and routing of transistors and interconnect, and to verify the functionality, timing, power, and parasitic effects.<br>4. Have an understanding of the characteristics of CMOS circuit construction and the comparison between different state-of-the-art CMOS technologies and processes.<br>5. Be able to complete a significant VLSI design project having a set of objective criteria and design constraints. | Upon successful completion of the course, the students will be able to:<br>1: Classify ICs, static and dynamic VLSI design techniques.<br>2: Design any CMOS digital VLSI combinatorial and sequential circuits.<br>3: Design, analyze and verify digital logic circuits and MOS memories as well as Physical layout designing of circiuts.<br>4: Model the CMOS circuits with equivalent parameters.<br>5: Attain the skill development in designing layout and ALU designs | 20.00% | 50.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 910 | IFHE 220 | Advanced Computer Architecture | EC 563 | M.Tech - VLSI | FST (IcfaiTech) | • To understand pipelining, instruction set architectures and memory addressing.<br>• To understand symmetric shared-memory architectures and their performance.<br>• To understand multiprocessor cache coherence using the directory based and snooping class of protocols.<br>• To understand the various models to achieve memory consistency.<br>• To understand the architectural aspects practically few case studies are included | • Design basic and intermediate RISC pipelines, including the instruction set, data paths, and ways of dealing with pipeline hazards.<br>• Consider various techniques of instruction-level parallelism, including superscalar execution, branch prediction, and speculation, in design of high-performance processors.<br>• State and understand memory hierarchy design, memory access time formula, performance improvement techniques, and trade-offs.<br>• State and compare properties of shared memory and distributed multiprocessor systems and cache coherency protocols.<br>• Learn from additional topics in computer architecture, such as multi-core processors, thread-level parallelism, and warehouse computing.<br>• Design, implement, and assign parallel tasks to a specific processors using MPI (Message Passing Interface) | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 911 | IFHE 220 | CAD for VLSI | EC 506 | M.Tech - VLSI | FST (IcfaiTech) | Introductory course<br>• Different stages in VLSI Design flow<br>• Front-end VLSI Design<br>• FPGA Design flow<br>Transistor level design issues<br>• Logic Synthesis and Static Timing Analysis<br>• High-speed circuits and processor architectures<br>• ASIC Design flow | At the end of the course, the student will be able to:<br>Specify the Layout techniques in IC<br>Identify the algorithms required for circuit simulators<br>Incorporate timing analysis and floor planning<br>Become entrepreneurs, by establishing CAD units for VLSI design | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 912 | IFHE 220 | CMOS Analog Circuits | EC 504 | M.Tech - VLSI | FST (IcfaiTech) | Smalland large signal models for analysis of analog integrated circuits.<br>Design, analysis, and evaluation of analog CMOS integrated circuits. As a representative benchmark, various types of amplifiers, current sources, voltage controlled oscillators, and other versatile circuit building blocks will be studied.<br>The circuit analyses will take into account non-idealeffects such as noise and variations in process parameters, supply voltages, and operating temperature.<br>Use of professionalcircuit simulators for design, analysis, and evaluation of integrated circuits.<br>Modeling and design of interconnects. Particularly, studies on transmission lines for high-speed on-chip and off-chip communications.<br>On-chip timing and synchronization techniques, including studies on clock- and data-recovery circuits and systems such as phase- and delay-locked-loops. | Upon successful completion of the course, the students will be able to:<br>1. To recall and identify the CMOS VLSI, design of CMOS logic circuits, switches and memory<br>2. To design CMOS logic circuits, CMOS Amplifiers<br>3. To apply CMOS Operational Amplifiers for meeting current and future VLSI challenges faced by the organization.<br>4. To compare the Comparators<br>5. To generalize the design techniques and analyze the characteristics of CMOS VLSI circuits<br>6. To enable the students develop the skill set CMOS circuit design | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

S. Upagyatakella
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 913 | IFHE 220 | CMOS Analog VLSI Design | EC 507 | M.Tech - VLSI | FST (IcfaiTech) | To develop and design of integrated circuits in the CMOS technology. | • To recall and identify the CMOS VLSI, design of CMOS logic circuits, switches and memory<br>• To design CMOS logic circuits, CMOS Amplifiers<br>• To apply CMOS Operational Amplifiers for meeting current and future VLSI challenges faced by the organization.<br>• To generalize the design techniques and analyze the characteristics of CMOS VLSI circuits<br>• The advanced tools like Cadence to realize the layout and make the student suitable to get ajob in VLSI based companies. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 914 | IFHE 220 | Digital Signal Processing | EC 551 | M.Tech - VLSI | FST (IcfaiTech) | • To provide a framework for the filter design aspects of digital signal processing.<br>• To develop the design methodology of digital FIR & IIR filters.<br>• To learn thesampling rate conversions and its applications to multirate digital signal processing. | • Analyze discrete-time systems in both time & transform domain and also through pole-zero placement.<br>• Analyze discrete-time signals and systems using DFT and FFT.<br>• Design and implement digital finite impulse response (FIR) filters and digital infinite impulse response (IIR) filters.<br>• Understand and develop multirate digital signal processing systems.<br>• The software used for lab activity make them to get a job in research and simulation section of any manufacturing industry. | 15.00% | 35.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 915 | IFHE 220 | Electronic Systems Design | EC 552 | M.Tech - VLSI | FST (IcfaiTech) | The course treats different aspects of printed circuit boards in electronic system design with the aim that the student should learn to design, simulate and assemble an electronic system. | Upon successful completion, students will have the knowledge and skills to:<br><br>Explain and use engineering abstractions and simple mathematical models to represent non-linear and active circuit elements (such as BJTs and op-amps).<br>Apply circuit analysis techniques in time and phasor domains (such as node-voltage method, mesh current method, Thevenin equivalent circuits, Phasors and complex impedances, Transfer functions, Bode plots) to solve electronic circuits.<br>Analyse and design analogue electronic circuits using BJT and op-amp amplifiers, opamp filters and op-amp comparator circuits.<br>Design combinational logic circuits using digital logic gates and timer circuits using the 555 Timer.<br>Collaborate effectively with responsibility for personal and group laboratory outputs.<br>Develop the skills needed for electronic system design industry | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 916 | IFHE 220 | Embedded Systems Design | EC 558 | M.Tech - VLSI | FST (IcfaiTech) | To introduce the Building Blocks of Embedded System<br>□ To Educate in Various Embedded Development Strategies<br>□ To Introduce Bus Communication in processors, Input/output interfacing.<br>□ To impart knowledge in various processor scheduling algorithms.<br>□ To introduce Basics of Real time operating system and example tutorials to discuss on one real time operating system tool | CO1: Acquire a basic knowledge about fundamentals of microcontrollers<br>CO2: Acquire a basic knowledge about programming and system control to perform a specific task.<br>CO3: Acquire knowledge about devices and buses used in embedded networking<br>CO4: Develop programming skills in embedded systems for various applications.<br>CO5: Acquire knowledge about basic concepts of circuit emulators.<br>CO6: Acquire knowledge about Life cycle of embedded design and its testing. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 917 | IFHE 220 | Introduction to MEMS | EC 556 | M.Tech - VLSI | FST (IcfaiTech) | The objective of this course is to make students to gain basic knowledge on overview of MEMS (Micro electro Mechanical System) and various fabrication techniques. This enables them to design, analysis, fabrication and testing the MEMS based components. And to introduce the students various opportunities in the emerging field of MEMS. | At the end of the course, the students will be able to<br>1. Illustrate the concepts of MEMS mechanisms<br>2. Synthesis the MEMS based IC<br>3. Develop a model based on the MEMS properties<br>4. Design an Intelligent Control of MEMS<br>5. Propose a MEMS design for the real time applications to entrepreneurship development. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 918 | IFHE 220 | Low Power Design | EC 508 | M.Tech - VLSI | FST (IcfaiTech) | It provides a comprehensive view of low power design from system level to device level. For the first time outside corporate settings, this course covers Voltage Aware Booleans in great detail with labs. Low Power Design for the IOT era is another new module. This is a front end course and needs to be followed up with a backend implantation course for VLSI students. | At the completion of the course, the student will be able to<br>1. Identify the VLSI power estimation, design of CMOS logic circuits, switches and memory<br>2. Develop Probabilistic Techniques for signal activity estimation and Statistical Techniques<br>3. To apply Low power VLSI techniques for meeting current and future VLSI challenges faced<br>by the organization<br>4. To generalize the design techniques and analyze the characteristics of VLSI power dissipation<br>Synthesis for Low Power, Low Power Static RAM Architectures<br>5. Attain employability in low power design VLSI industry. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 919 | IFHE 220 | Physics of Transistors | EC 501 | M.Tech - VLSI | FST (IcfaiTech) | This course develops a simple framework for understanding the essential physics of transistors, including modern nanoscale transistors. Important technology considerations and circuit applications are also discussed. | Upon successful completion of the course, the students will be able to:<br>Explain the Basic properties of semiconductors including the band gap, charge carrier concentration, doping and charge carrier injection or charge carrier excitation.<br>Explain the working, design considerations and applications of various semiconducting devices including p-n junctions, BJTs, and FETs.<br>Describe the working and design considerations for various photonic devices like photo detectors, solar cells and LEDs.<br>Get the skills of employability in semiconductor device manufacturing industry. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION * HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 920 | IFHE 220 | RF Microelectronics Chip Design | EC 554 | M.Tech - VLSI | FST (IcfaiTech) | The aim of the course is to provide students with a comprehensive insight on fundamental Radio Frequency transceiver design along with exposure to latest design practices used in RF circuit design. Basic methods and techniques for RF CMOS circuit design and analysis will be discussed throughout the course. The homeworks and course-projects in the course are designed to help students to acquire a hands-on design experience on some of the key elements of RF CMOS transceiver. | Upon successful completion of the course, the students will be able to:<br>1. Understand the design bottlenecks specific to RF IC design.<br>2. Identify the noise sources, develop noise models for the devices and systems.<br>3. Specify the noise and interference performance metrics like noise figure and different<br>matching criteria.<br>4. Design various constituent blocks of RF receiver front end | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |
| 921 | IFHE 220 | Sensors Interfacing | EC 553 | M.Tech - VLSI | FST (IcfaiTech) | (1) theoretical understanding of various physical phenomena behind the operation of different types of sensors and microsystems, (2) designing of<br>sensors with appropriate electronic interface as a complete system. Various types of sensors discussed<br>during this course are magnetic, optical, bio, chemical, radiation, electrical and mechanical etc. In general<br>the students are introduced to the current technology of sensors: electronic, photonic, microfluidics<br>and new materials. The course emphasis is on the integration of electronics with sensors to provide a smart transducer or a system on a chip with multiple integrated devices. | Analyze the effect of ADC parameters in Sensor Interfacing<br>Identify the sensors and their requirements for the real world problems.<br>Analyze the effects of ADC parameters in sensor interfacing.<br>Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.<br>Demonstrate an ability to work in teams and manage the conduct of the research study.<br>Achieve employability in sensors design and implementation field. | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 922 | | CMOS Analog VLSI Design | | M.Tech - VLSI | | Course deals with Basic theory of Analog Circuits, Design principles and techniques for analog IC's blocks implemented in CMOS technology. Although analog design appears to be much less systematic than digital one, This course will try to get some idea of good design principles to simplify process. | At the completion of the course, the student will be able to Understand the operation of CMOS devices Understand the MOS device physics and different passive devices Develop the differential amplifiers and phase-locked loops at chip-level. Attain the skill development of analog testing and layout design. | | | | | |
| 923 | | VLSI Technology | | | | Impart a knowledge about VLSI Integrated circuits their structures, evolution and benefits of these circuits in realizing complex electronics functions to students. 2. Impart knowledge about IC fabrication technologies and their advancement over time. 3. Impart knowledge about the sub process technologies that are involved in IC fabrication and how they are put together to form complete fabrication process. 4. Acquaint the students about clean room environments needed for IC fabrication and their importance. 5. Impart knowledge about complex process of VLSI packaging and testing and their advancements. | Describe evolution and progress of VLSI technology, Electronic functions and basic device structures on Integrated circuits. 2. Apply alternate technologies and Process flows for realization of VLSI chips 3. Demonstrate Unit processes involved in VLSI technology such as silicon wafer preparation, epitaxy, oxidation and diffusion, lithography, etching, implantation etc. 4. Specify Other unit processes involved in VLSI technology such as deposition, lithography and etching 5. Specify Clean Room environments needed for VLSI processing and packaging and testing of the VLSI chips | | | | | |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT 1956)
ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 924 | IFHE 220 | System Hardware Design | EC 503 | M.Tech - VLSI | FST (IcfaiTech) | The main objective is to provide information on various computer hardware and their design. It focuses on various concepts regarding processor, memory and arithmetic operations. It also emphasizes on multicores, multiprocessors and clusters. It also deals with non-functional requirements that play vital role in the design. | On the successful completion of this course, the students will be able to<br>Describe the techniques used for VLSI fabrication, design of CMOS logic circuits, switches and memory<br>Describe the techniques used the design of CMOS logic circuits, switches and memory in VLSI<br>Explain and compare the architectures for FPGA, PAL and PLDs and evaluate their characteristics such as area, power dissipation and reliability<br>Use the advanced FPGAs to realize Digital signal processing systems<br>Develop the skills and techniques for chip level and board level testing | 20.00% | 30.00% | 10.00% | 40.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 925 | | Low Power Design | | M.Tech - VLSI | | To expose the students to the low voltage device modeling, low voltage, low power VLSI CMOS circuit design. | At the completion of the course, the student will be able to<br>1. Identify the VLSI power estimation, design of CMOS logic circuits, switches and memory<br>2. Develop Probabilistic Techniques for signal activity estimation and Statistical Techniques<br>3. To apply Low power VLSI techniques for meeting current and future VLSI challenges faced<br>by the organization<br>4. To generalize the design techniques and analyze the characteristics of VLSI power dissipation<br>Synthesis for Low Power, Low Power Static RAM Architectures<br>5. Attain employability in low power design VLSI industry. | | | | | |
| 926 | IFHE 220 | VLSI Technology | EC 505 | M.Tech - VLSI | FST (IcfaiTech) | CO1: Identify the various IC fabrication methods.<br>CO2 : Express the Layout of simple MOS circuit using Lambda based design rules.<br>CO3 : Apply the Lambda based design rules for subsystem design<br>CO4 : Differentiate various FPGA architectures.<br>CO5: Design an application using Verilog HDL.<br>CO6 : Concepts of modeling a digital system using Hardware Description Language | Upon successful completion of the course, the students will be able to<br>CO1 Identify the various design limits material used for fabrication.<br>CO2 Describe the Performance of technology scaling.<br>CO3 Understand the complexities involved in the integrated circuits.<br>CO4 Apply principles to Identify and Analyze the various steps for the fabrication of various components<br>CO5 Gain the skills needed for employability in VLSI chip design industry. | 10.00% | 35.00% | 10.00% | 45.00% | 100.00% |

REGISTRAR

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 927 | IFHE 210 | Advanced Inorganic Chemistry | CH613 | PhD - Chemistry | FST (IcfaiTech) | you will have a broad knowledge of the principles and concepts of contemporary inorganic chemistry.<br>you can discuss and define the chemical properties of main group compounds.<br>you can elucidate the electronic structure of a variety of d-metal complexes.<br>you can describe the structure and properties of different classes of transition metal oxides<br>you can explain the occurrence of superconductivity and magnetic order in solids<br>you understand the applications of battery materials and supercapacitors<br>you can rationalize and discuss current issues in inorganic chemistry by writing a review article on a given topic. | Upon successful completion of the course, student will be able to:<br>CO1- Understand, assess and exploit how various classes of inorganic compounds important to modern inorganic chemistry can be prepared and characterised from choice of reactants and experimental conditions through to product characterization, explaining the principles involved and exemplify the specialist techniques used.<br><br>CO2- Demonstrate advanced understanding of the physical principles underpinning inorganic chemistry, including synthesis, reactivity, properties, structure and bonding. To understand and apply methodologies for data analyses in problem solving.<br><br>CO3- Demonstrate critical knowledge and understanding of advanced, specialised inorganic chemistry, express originality in thinking, be able to solve abstract problems and communicate ideas and concepts to a professional standard and exercise independent thought, autonomy and initiative in learning. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 928 | IFHE 210 | Advanced Physical Chemistry | CH 615 | PhD - Chemistry | FST (IcfaiTech) | Calculate and interpret kinetics data (e. g. chemical reaction rates, rate constants)<br>Use steady state approximation and predict mechanisms of chemical reactions<br>Apply transition state theory and collision theory<br>Understand photochemistry and Jablonski diagrams | Upon successful completion of the course, student will be able to:<br>CO1- Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.<br><br>CO2- Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.<br>CO3- Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 929 | IFHE 210 | Chemical and Electrochemical Kinetics | CH 617 | PhD - Chemistry | FST (IcfaiTech) | To develop an understanding of non-ideality of electrolyte solutions and<br>its effect on equilibrium constants, electrolyte solutions and solution<br>conductivity. Learn about the thermodynamics of electrochemistry, the<br>structure of the electrode/electrolyte interface and electrode processes. | Upon successful completion of the course, student will be able to:<br>CO1- Concepts related to chemical kinetics, basic electrochemistry and phase equilibrium of binary mixtures will be discussed.<br><br>CO2- This course is crucial for chemistry students irrespective of specialization since chemical kinetics, solution property are important for all branches of chemists.<br>CO3- define central parts of electrochemical cells and electrochemical equipment such as anode, cathode, membrane, diaphragm, liquid junction, reference electrode, and potentiostat. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 930 | IFHE 210 | General Chemistry | CH612 | PhD - Chemistry | FST (IcfaiTech) | To become familiar with the scope, methodology, and application of modern chemistry and to learn to appreciate its ability to explain the physical world.<br>2. To understand that all matter consists of atoms, and that the limitless variety observed around us stems from the ways that these atoms bond with one another.<br>3. To learn problem solving and learning to interpret the data, to employ valid and efficient methods of analysis, and to assess whether or not the results of calculations are reasonable.<br>4. To learn the principles of atomic and molecular theory, stoichiometry, and thermodynamics.<br>5. To generalize the analytical and quantitative skills gained in this course and to apply them in more advanced courses and throughout ones career. | Course Outcomes<br>Upon successful completion of the course, student will be able to:<br>CO1- The student will understand the importance of the Periodic Table of the Elements, how it came to be, and its role in organizing chemical information.<br><br>CO2- The student will understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics, and other disciplines to a wide variety of chemical problems.<br><br>CO3- The student will learn the laboratory skills needed to design, safely conduct and interpret chemical research. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 931 | IFHE 210 | Inorganic and Organometallic Chemistry | CH 618 | PhD - Chemistry | FST (IcfaiTech) | Topics may include recent developments in organic synthesis, organometallics, heterocyclics, phase transfer catalysis, and physical organic chemistry. May be repeated under different topics. | Upon successful completion of the course, student will be able to:<br>CO1- Classify & recognize the symmetry elements and their operations as required to specify molecular symmetry & possible point groups from symmetry elements & be able to find point group of molecule by systemic procedure .<br>CO2 Discuss the d-orbital splitting pattern in different geometries like octahedral, tetrahedral.<br>• CO3 Calculate magnetic moment & crystal field stabilization energy of metal complexes. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 932 | IFHE 210 | Organic Synthesis & Synthine Mechanism | CH 614 | PhD - Chemistry | FST (IcfaiTech) | To study about the concepts of Symmetry operations, symmetry elements & symmetry criteria<br>To study about the different types of substitution reactions & also about the mechanism of reactions of Transition metal complexes<br>To learn about the Formation of binary and ternary metal complexes, types of stability constants & their determination<br>To understand about the different theories of bonding in metal complexes and application | Upon successful completion of the course, student will be able to:<br>CO1- Able to recognize the symmetry elements and their associated operations as required to specify molecular symmetry.<br>CO2- Acquire knowledge about the formation of complexes in solutions and their stability, factors effecting the stability & HSAB principle<br>CO3- Able to explain bonding in metal complexes and the magnetic behaviour of complexes and its application. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 933 | IFHE 210 | Research Methodology-I | CH611 | PhD - Chemistry | FST (IcfaiTech) | identify and discuss the role and importance of research in the social sciences.<br>identify and discuss the issues and concepts salient to the research process.<br>identify and discuss the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project.<br>identify and discuss the concepts and procedures of sampling, data collection, analysis and reporting. | Upon successful completion of the course, student will be able to:<br>CO1- To establish a common basis for the PhD research education as well as to provide insight in to the history and the theory of science, qualitative and quantitative research methodology and research ethics<br>CO2- To apply the knowledge and skills for the interpretation of data analysis and data presentation in user friendly formats.<br>CO3- To provide insight into the theory of science research methodology and research ethics. | 15.00% | 30.00% | 20.00% | 35.00% | 100.00% |
| 934 | IFHE 210 | Research Methodology-II | CH 619 | PhD - Chemistry | FST (IcfaiTech) | • Using probability as a tool for addressing random variation and statistical relationships.<br>• Sampling methodology and principles<br>• Inference and various cases of it<br>• Exposure to standard nonparametric tests<br>• Methods of Regression Analysis | Upon successful completion of the course, student will be able to:<br>CO1- To construct a math model of a real world engineering system<br>CO2- To analyze power requirements for engineering systems<br>CO3- To analyze and solve higher order math models using various techniques<br>CO4- To solve real world problems using genetic algorithms<br>CO5- To perform qualitative analysis | 15.00% | 30.00% | 20.00% | 35.00% | 100.00% |

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 935 | IFHE 213 | Advanced Real Time Systems | EC503 | PhD - Engineering | FST (IcfaiTech) | Describe real-time systems and how real-time resource management algorithms and mechanisms (e.g., scheduling, synchronization) enable satisfaction of application timing constraints<br>Conduct real-time schedulability analysis<br>Design, analyze, and implement real-time scheduling algorithms and real-time synchronization protocols in operating system kernels<br>Write, modify, and debug operating system kernel subsystems including the scheduling subsystem<br>Design, analyze, implement, and evaluate real-time computing solutions in the spaces of scheduling, synchronization, and memory management that | develop an understanding of various Real Time systems Application<br>obtain a broad understanding of the technologies and applications for the emerging and exciting domain of real-time systems<br>get in-depth hands-on experience in designing and developing a real operational system. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 936 | IFHE 213 | Applied Machine Learning | CS501 | PhD - Engineering | FST (IcfaiTech) | Understand and implement the most popular learning algorithms.<br>Perform feature selection and experimental set up on real tasks.<br>Evaluate multiple learning algorithms across several tasks. | Course Objectives:<br><br>The course objective is to study the theory and practice of constructing algorithms that learn (functions) and make optimal decisions from data and experience.<br>Machine learning is a field with goals overlapping with other disciplines, in particular, statistics, algorithms, engineering, or optimization theory.<br>It also has wide applications to a number of scientific areas such as finance, life sciences, social sciences, or medicine. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 937 | IFHE 213 | Communication Protocols in IoT | CS502 | PhD - Engineering | FST (IcfaiTech) | An overview of protocols involved in Internet of Things devices and applications. Help clarify with IoT layer technology stack and head-to-head comparisons. | Course Objectives<br>Understand the basic building blocks of IoT Technology<br>Explore the vast communication technologies in IoT<br>Develop IoT Application<br>Explain to analyze the performance of various communication protocols of IoT<br>Describe to choose the appropriate communication protocol for the given requirements<br>Describe to Customize the communication technologies for the given applications | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 938 | IFHE 213 | Design for Testability Yield and Reliability | EC502 | PhD - Engineering | FST (IcfaiTech) | The course will provide the students with a general knowledge in the field of design and test of digital integrated circuits, with particular reference to high reliability application cases in the field of space, automotive, transport, biomedical devices, as well as advanced microprocessors for consumer electronics. | To study techniques in testing of VLSI chips.<br>To understand fault models and their use in testing of VLSI Circuits.<br>To learn fault modelling and testing for memory. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 939 | IFHE 213 | Pattern Recognition and Neural Networks | EC501 | PhD - Engineering | FST (IcfaiTech) | Basic neuron models: McCulloch-Pitts model and the generalized one, distance or similarity based neuron model, radial basis function model, etc.<br>Basic neural network models: multilayer perceptron, distance or similarity based neural networks, associative memory and self-organizing feature map, radial basis function based multilayer perceptron, neural network decision trees, etc.<br>Basic learning algorithms: the delta learning rule, the back propagation algorithm, self-organization learning, the r4-rule, etc.<br>Applications: pattern recognition, function approximation, information visualization, etc. | To understand Bayes Classification, Nearest Neighbor Rule, Neural Networks<br>To explain classification techniques such as Support Vector Machines and Multi classifiers for solving Bio-Medical problems. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 940 | | Pattern Recognition | | PhD - Engineering | | Pattern recognition techniques are used to design automated systems that improve their own performance through experience. This course covers the methodologies, technologies, and algorithms of statistical pattern recognition from a variety of perspectives. Topics including Bayesian Decision Theory, Estimation Theory, Linear Discrimination Functions, Nonparametric Techniques, Support Vector Machines, Neural Networks, Decision Trees, and Clustering Algorithms etc. will be presented. | After successful completion of the course student will be able to<br>Understand the need for image transforms ,different types of image transforms and their properties.<br>Learn different techniques employed for the enhancement of images.<br>Learn different causes for image degradation and overview of image restoration techniques.<br>Implement simple pattern classifiers, classifier combinations, and structural pattern recognizers. | | | | | |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC ACT,1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 941 | IFHE 213 | Research Methodology-I | RM501 | PhD - Engineering | FST (IcfaiTech) | identify and discuss the role and importance of research in the social sciences.<br>identify and discuss the issues and concepts salient to the research process.<br>identify and discuss the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project.<br>identify and discuss the concepts and procedures of sampling, data collection, analysis and reporting. | Upon successful completion of the course, student will be able to:<br>CO1- To establish a common basis for the PhD research education as well as to provide insight in to the history and the theory of science, qualitative and quantitative research methodology and research ethics<br>CO2- To apply the knowledge and skills for the interpretation of data analysis and data presentation in user friendly formats.<br>CO3- To provide insight into the theory of science research methodology and research ethics. | 15.00% | 30.00% | 20.00% | 35.00% | 100.00% |
| 942 | IFHE 213 | Research Methodology-II | RM502 | PhD - Engineering | FST (IcfaiTech) | • Using probability as a tool for addressing random variation and statistical relationships.<br>• Sampling methodology and principles<br>• Inference and various cases of it<br>• Exposure to standard nonparametric tests<br>• Methods of Regression Analysis | Upon successful completion of the course, student will be able to:<br>CO1- To construct a math model of a real world engineering system<br>CO2- To analyze power requirements for engineering systems<br>CO3- To analyze and solve higher order math models using various techniques<br>CO4- To solve real world problems using genetic algorithms<br>CO5- To perform qualitative analysis | 15.00% | 30.00% | 20.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 943 | | Linear Algebra | | PhD - Mathematics | | Solve systems of linear equations using various methods including Gaussian and GaussJordan elimination and inverse matrices.<br>□ Perform matrix algebra, invertibility, and the transpose and understand vector algebra in R n .<br>□ Determine relationship between coefficient matrix invertibility and solutions to a system of linear equations and the inverse matrices.<br>□ Define special matrices: diagonal, triangular, and symmetric<br>□ Understand determinants and their properties.<br>□ Understand real vector spaces and subspaces and apply their properties.<br>□ Understand linear independence and dependence.<br>□ Find basis and dimension of a vector space,and understand change of basis.<br>□ Find a basis for the row space, column space and null space of a matrix and find the rank and nullity of a matrix.<br>□ Compute linear transformations, kernel and range, and inverse linear transformations, and find matrices of general linear transformations.<br>□ Find the dimension of spaces such as those | CO1 to compute the inverse of an invertible matrix.<br>CO2 to find the null space of a matrix and represent it as the span of independent vectors.<br>CO3 to find the matrix representation of a linear transformation given bases of the relevant vector spaces. | | | | | |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 944 | IFHE 211 | Generalized inverses Theory and Applications | MA 624 | PhD - Mathematics | FST (IcfaiTech) | Course Objectives<br>1. To understand the basic concepts of Mathematics.<br>2. To have a proper understanding of mathematical applications in different fields | Course Outcomes<br>On completion of this course, the students will be able to:<br>CO1. Explain the concepts and use equations, formulae, and mathematical expressions and relationships in a variety of contexts<br>CO2. Apply the knowledge in mathematics (algebra, matrices, calculus) in solving business problems<br>CO3. Analyse and demonstrate mathematical skills required in mathematically intensive areas CO4. Integrate concept in international business concepts with functioning of global trade | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 945 | IFHE 211 | LATTICE THEORY | MA623 | PhD - Mathematics | FST (IcfaiTech) | To know the concept and applications of Lattice Theory.<br>To study relation between Graph Theory and Lattice Theory<br>To know Lattice-ordered Groups and related concepts. | Understand the fundamental concepts of Lattice Theory and Lattice-ordered Groups.<br>Explain the relation between Graph Theory and Lattice Theory.<br>Learn the beauty of Lattice-ordered Groups and related concepts. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

FOR HIGHER EDUCATION FOUNDATION HYDERABAD

S. Vijayalakshmi
REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 946 | IFHE 211 | Linear Algebra | MA614 | PhD - Mathematics | FST (IcfaiTech) | • To solve systems of linear equations<br>• To compute standard forms of given matrices<br>• To compute eigenvalues and eigenvectors of 3x3 real matrices<br>• To compute quadratic forms and diagonalize matrices.<br>• To introduce complex matrices and obtain analogues of real matrix theorems | • Systematically solve sets of linear equations of small size<br>• Analyse eigenvalue/eigenvector problems and compute the same<br>• Apply the concept of rank for a variety of problems<br>• Perform diagonalization and related operations on quadratic forms | 15.00% | 25.00% | 10.00% | 50.00% | 100.00% |
| 947 | IFHE 211 | Number Theory | MA612 | PhD - Mathematics | FST (IcfaiTech) | Identify and apply various properties of and relating to the integers including the Well-Ordering Principle, primes, unique factorization, the division algorithm, and greatest common divisors.<br>2. Identify certain number theoretic functions and their properties.<br>3. Understand the concept of a congruence and use various results related to congruences including the Chinese Remainder Theorem.<br>4. Solve certain types of Diophantine equations.<br>5. Identify how number theory is related to and used in cryptography. | find quotients and remainders from integer division<br><br>apply Euclid's algorithm and backwards substitution<br><br>understand the definitions of congruences, residue classes and least residues<br><br>add and subtract integers, modulo n, multiply integers and calculate powers, modulo n<br><br>determine multiplicative inverses, modulo n and use to solve linear congruences. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University under Section 3 of the UGC Act, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 948 | IFHE 211 | Research Methodology-I | MA611 | PhD - Mathematics | FST (IcfaiTech) | identify and discuss the role and importance of research in the social sciences.<br>identify and discuss the issues and concepts salient to the research process.<br>identify and discuss the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project.<br>identify and discuss the concepts and procedures of sampling, data collection, analysis and reporting. | Upon successful completion of the course, student will be able to:<br>CO1- To construct a math model of a real world engineering system<br>CO2- To analyze power requirements for engineering systems<br>CO3- To analyze and solve higher order math models using various techniques<br>CO4- To solve real world problems using genetic algorithms<br>CO5- To perform qualitative analysis | 15.00% | 30.00% | 20.00% | 35.00% | 100.00% |
| 949 | IFHE 211 | Research Methodology-II | MA621 | PhD - Mathematics | FST (IcfaiTech) | • Using probability as a tool for addressing random variation and statistical relationships.<br>• Sampling methodology and principles<br>• Inference and various cases of it<br>• Exposure to standard nonparametric tests<br>• Methods of Regression Analysis | Upon successful completion of the course, student will be able to:<br>CO1- To construct a math model of a real world engineering system<br>CO2- To analyze power requirements for engineering systems<br>CO3- To analyze and solve higher order math models using various techniques<br>CO4- To solve real world problems using genetic algorithms<br>CO5- To perform qualitative analysis | 15.00% | 30.00% | 20.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT,1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 950 | IFHE 212 | Basic Solid State Physics & Materials Science | PH614 | PhD - Physics | FST (IcfaiTech) | To study some of the basic properties of the condensed phase of matter especially solids. | To impart the fundamentals of Solid State Physics and Material Science, that will be required at the research level. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 951 | IFHE 212 | Introduction to Numerical and Computational methods of Research | PH622 | PhD - Physics | FST (IcfaiTech) | To explore complex systems, physicists, engineers, financiers and mathematicians require computational methods since mathematical models are only rarely solvable algebraically. Numerical methods, based upon sound computational mathematics, are the basic algorithms underpinning computer predictions in modern systems science. The course will cover the classical fundamental topics in numerical methods such as, approximation, numerical integration, numerical linear algebra, solution of nonlinear algebraic systems and solution of ordinary differential equations. | 1 Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.<br>2 Apply numerical methods to obtain approximate solutions to mathematical problems.<br>3 Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.<br>4 Analyse and evaluate the accuracy of common numerical methods.<br>5 Implement numerical methods in Matlab.<br>6 Write efficient, well-documented Matlab code and present numerical results in an informative way. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University u/s 3 of the UGC Act, 1956)
ICFAI FOUNDATION FOR HIGHER EDUCATION

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 952 | IFHE 212 | Material Preparation and Characterization | PH624 | PhD - Physics | FST (IcfaiTech) | To introduce the materials characterization techniques to the students<br>Help the students to understand the instrumentation aspects<br>To provide a detailed understanding of data interpretation<br>To provide hands on experience of the characterization techniques | Students will learn the sample preparation methods and sample handling<br>Students will acquire the ability to analyze the data obtained from the techniques<br>The student will be able to identify the ideal method of analysis to draw the required information | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 953 | IFHE 212 | Mathematical Physics-A Review | PH613 | PhD - Physics | FST (IcfaiTech) | Learn the fundamental and some advanced mathematical techniques which are essential at research level. | Learn the fundamental and some advanced mathematical techniques which are essential at research level. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

THE ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University u/s 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 954 | IFHE 212 | Nano Science and Technology | PH625 | PhD - Physics | FST (IcfaiTech) | Beginners will be able to acquaint themselves with the excited subject though they are novice, whereas advanced learners will equip themselves to solve the complicated issues further.<br>To know the importance of the synthesis method addressed in the material properties and give practical experience of nanomaterials synthesis/properties and characterization; investigations into the various factors influence the properties of nanomaterials, optimizing the procedures, and implementations to the new designs<br>To provide a sound understanding of the various concepts involved in fabrication of device architectures' and able to evaluate them in advance | The intended course covers the whole spectrum of nanomaterials ranging from introduction, classification, synthesis, properties, and characterization tools of nanophase materials to application including some new developments in various aspects. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 955 | IFHE 212 | Physics of Amorphous, Dielectric and ferroelectric materials | PH623 | PhD - Physics | FST (IcfaiTech) | This course deals with paraelectrics which are polarized by an electric field, covers theories and applications of piezoelectric materials which are polarized by stress, pyroelectrics which hold spontaneous polarization without an external signal, as well as ferroelectrics, for which the orientation of spontaneous polarization changes with the electric field. | CO1 to understand the meaning of physical quantities to describe dielectric property of substances as well as the concept of polarization based on the material science. CO2 to recall electromagnetic theory, thermodynamics, quantum physics etc., through the learning of dielectricity. | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be University Under Section 3 of the UGC Act, 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 956 | IFHE 212 | Quantum Mechanics-A Review | PH612 | PhD - Physics | FST (IcfaiTech) | Connect the historical development of quantum mechanics with previous knowledge and learn the basic properties of quantum world. | CO1 pinpoint the historical aspects of development of quantum mechanics<br>CO2 understand and explain the differences between classical and quantum mechanics<br>CO3 understand the idea of wave function<br>CO4 understand the uncertainty relations<br>CO5 solve Schroedinger equation for simple potentials<br>CO6 spot, identify and relate the eigenvalue problems for energy, momentum, angular momentum and central potentials explain the idea of spin | 5.00% | 30.00% | 5.00% | 60.00% | 100.00% |
| 957 | IFHE 212 | Research Methodology-I | PH611 | PhD - Physics | FST (IcfaiTech) | identify and discuss the role and importance of research in the social sciences.<br>identify and discuss the issues and concepts salient to the research process.<br>identify and discuss the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project.<br>identify and discuss the concepts and procedures of sampling, data collection, analysis and reporting. | Upon successful completion of the course, student will be able to:<br>CO1- To establish a common basis for the PhD research education as well as to provide insight in to the history and the theory of science, qualitative and quantitative research methodology and research ethics<br>CO2- To apply the knowledge and skills for the interpretation of data analysis and data presentation in user friendly formats.<br>CO3- To provide insight into the theory of science research methodology and research ethics. | 15.00% | 30.00% | 20.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT, 1956)

| Sno | Program Code | Name of the course | Course Code | Department | Name of the Program | Course Objectives | Course outcomes (CO) | % Local | % National | % Regional | % Global | % Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 958 | IFHE 212 | Research Methodology-II | PH621 | PhD - Physics | FST (IcfaiTech) | • Using probability as a tool for addressing random variation and statistical relationships.<br>• Sampling methodology and principles<br>• Inference and various cases of it<br>• Exposure to standard nonparametric tests<br>• Methods of Regression Analysis | • The student will have the knowledge and understanding of how to apply probability concepts and theorems into real world problems. | 15.00% | 30.00% | 20.00% | 35.00% | 100.00% |

REGISTRAR
THE ICFAI FOUNDATION FOR HIGHER EDUCATION
(Deemed-to-be-University Under Section 3 of the UGC ACT 1956)

ICFAI FOUNDATION FOR HIGHER EDUCATION HYDERABAD