

Course No	Course Title	L	P	U
HS 311	Dynamics of Social Change	3	0	3

Learning Objectives

The objective of this course is to enable students to have an insight into the social processes, sociological thought, methodology, sociological concepts and recent trends in modernization so as to empower the students to become active citizens. Sociological study aids in comprehending one's identity, thinking and action, it makes one more tolerant of human differences.

Course Contents:

Unit I

Sociology: its fundamentals, development of its methods and theories; Sociology and its relationship with other social sciences. Society: concepts and theories. Socialization and its theories, Social groups: Crowd Community, Association, Institutions.

Unit II

Family & Marriage: concepts, theories of origin; types, functions and changing patterns. Demographic transition.

Culture and its determinants: Social norms, Folkways, Mores, Taboos, Social roles, Social responsibility. Culture and personality.

Unit III

Social stratification: Caste, class, their functions and changing patterns.

Social Change: Concepts, Theories and Process and Dynamics of social change, Factors, Resistance to social change.

Unit IV

Modernization Concept: Industry and social change, Urbanization and rural sociology.

The role of education as a vital force for social change and to highlight the role of social institutions in educational and social developments.

Unit V

Sociology of Religion: Aspects, origin, Hinduism. Social disorganization and delinquency.


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Text Book

Fundamentals of Sociology, Gisbert. P, Orient Longman, 3rd Edition, 1994.

Reference book(s)

1. Sociology - Systematic Introduction. Johnson.M.Harry. Allied Publishers, 2001
2. Sociology – A Guide to Problems and Literature. Bottomore T. T. Blackie & Sons, 1986.

Learning Outcomes:

After going through this course, the student will be able to:

- Define what social change is.
- Differentiate between social change and cultural change.
- Understand various characteristics of social change.
- Understand various sources of social change.
- Understand various factors of social change.
- Understand various theories of social change given by various sociologists.
- Understand the role of education for social change.

Course No: CE418	Course Title: Environmental Impact Assessment	L	P	U
		2	0	2

Course Learning Objectives

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.

Course Content

UNIT I

Basic concepts of EIA- introduction- EIA procedure- Systematic Approach for Using EIA as a Planning Tool for Major Project Activities - Preparation of Environmental Base Map- Identification of Study Area- Classification of Environmental Parameters- Formation of EIA Study Team- Preparation of Terms of Reference- Preparation of an EIA Report- Environmental Monitoring and management Plan- Draft and Final Environmental Impact Statements- Impact Analysis- Format and Content of a Draft Environmental Impact Statements (DEIS)- DEIS Processing- Final Environmental Impact Statements (FEIS)- Comparative Evaluation Alternatives from EIA Studies- Selecting a Preferred Alternative- Conceptual Basis for Trade-Off Analysis- Importance Weighting of Decision Factors

UNIT II

Introduction- Criteria for the Selection of EIA Methodology- EIA Methods- Predictive Models for Impact Assessment

UNIT III

Introduction- Soils and Ground water- Methodology for the Prediction and Assessment of Impacts on Soil and Groundwater References- Project Which Create Impact Concerns for the Surface-water Environment- Systematic Methods for Evaluation of Impacts of Various Developmental Activities on Surface Water Environment- General Methodology for the Assessment of Impacts on Biological Environment- Systematic Approach for Evaluating Biological Impacts- Typical Examples for Carrying out EIA- Typical Example Assessment of Impacts of Road Development on Flora and Fauna- A Generalized Approach for Assessment of Air Pollution Impact- Basic Information of Noise- Noise Measurement- Effects of Noise of People- Systematic Methodology for Assessing Environmental Impacts of Noise

UNIT IV

Introduction- Concepts of Environmental Remote Sensing- Basic Principles of Remote Sensing- Electromagnetic Energy- Photography and Optical Data- Airborne Light Detection and Ranging System (LIDAR)- Thermal Imagery- Radar- Satellite Orbits- Application of Environmental Remote Sensing for EIA- Linear Projects- Coastal Zone Studies- Estuaries-

Land Use and Land Cover Studies- Sources of Remote Sensing Applications- Application of GIS for EIA- What is a GIS?- GIS Concepts and Techniques- GIS for Environmental Impact Assessment- Possible Approaches- Resource Implications- GIS in Screening, Scoping and Baseline Studies- Databases for GIS- Major Applications of GIS

Use the mathematical models in EIA – Water quality, air quality and noise; assumptions and limitations. Basic tenets of Global Climate Models

UNIT V

Introduction- Environmental Impact of Industrial Development- Physical Resources- Ecological Resources- Human use values- Quality-of-life values- Project Siting- Factors to be considered in Making Assessment Decisions- Guidelines for Preparations of TORS for Life of Industrial Development Projects for Initial Environmental Examination- Preparation of EIA of Land Clearing Projects- Assessment of Impacts of Traffic and Transportation- Physiography and Drainage- Geology and Structure- Climate- Soil Series- Land use/ Land cover- Preparation of the Secondary Overlays- Slope- Generation of Final Overlays for Decision Making- Hydrogeomorphology and Groundwater- Land-Irrigability- Composite Erosion Intensity Units/Composite Land Development Sites- Land Capability- Sediment Yield Index- Treatment Plans- Development Plan for the command Area

Text Books

1. Canter, L.W. (1995). *Environmental impact assessment*. 2nd edn. New York, NY, USA: McGraw Hill Higher Education.

Reference Books

1. Dalal-Clayton, B. and Sadler, B. (2005). *Strategic environmental assessment a Sourcebook and reference guide to international experience*. London: Earthscan
2. Wood, C. and Thérivel, R. (1999). *Handbook of environmental impact assessment: Impact and limitations*. Vol.2 Edited by Judith Petts. Malden, MA, USA: Wiley, John & Sons
3. Anjaneyulu, Y., Manickam, V. and Manikam, V. (2011). *Environmental impact assessment methodologies*. 2nd edn. Hyderabad, India: Taylor & Francis.

Course Outcomes

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



Course No: IMEELS112	Course Title: English Language Skills	L	P	U
		2	4	4

Course Learning Objectives

- To familiarizing learners with aspects of pronunciation to attain intelligibility and grammatical accuracy in spoken and written English.
- To provides intensive practice and extensive exposure to the four basic skills; listening, speaking, reading and writing

Course Contents

UNIT-I

English Sound System: distinction between letters and sounds, classification of English sounds, syllable structure, confusing sounds for practice, words and sentences for practicing vowel contrasts.

Accent Patterns: accentual patterns of single words, accentual patterns of compound words, accent change according to function, sentence accent.

Effective speech: elision of sounds or syllables, addition of sounds or syllables, transposition sounds, pronunciation based on semantics, inflectional suffixes and some common word endings, general suggestions for pronunciation, Pronunciation of consecutive consonants.

Listening skills: hearing and listening, phonetic features of listening, purpose of listening, barrier to listening, guidelines for improving listening.

Art of conversation: small talk, body language, principles of a good conversationalist.

Debate: process of organization, purpose, rebuttal, participating in a debate, preparation for the debate.

Group Discussion: conversation, debate and GD, kinds of groups, importance and features of GD (oral communication skill, leadership skills, intensive listening skills, nonverbal communication clues), strategies of a group interaction, barriers to an effective GD, suggestions for self-improvement.

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UNIT-II

Uses of dictionary: the meaning, spelling and pronunciation of a word, antonyms and synonyms, grammar, abbreviations and dictionary symbols, use of thesaurus.

Punctuation: end punctuation marks, internal punctuation marks, direct quotation punctuation marks, word punctuation, spacing with punctuation, too much punctuation.

Prepositions and phrasal verbs: prepositions and phrasal verbs prepositions, Idiomatic combinations, phrasal verbs, Vocabulary extension: context clues, word analysis, semantic change, word-formation methods, antonyms, synonyms, one word substitutions.

Effective use of words: word order, words: its meaning, avoid clichés

Common errors in English: errors in using nouns, errors in using pronouns, errors in using prepositions, errors in using verbs, errors in using gerund/infinitive, use an infinitive not a gerund, errors in using adjectives, errors in using adverbs, errors in using conjunction, errors in using punctuation, common errors due to commonly confused words

UNIT-III

Effective use of sentences: unity and emphasis on sentences, coordination and subordination. Paragraph writing: unity, coherence and development of the paragraph, types of paragraphs, paragraph development.

Essay writing: features of an essay, thesis statement, organization of the material, modes of developing essays, Revise and proofread essay, practice essay.

UNIT-IV

Reading Skill: mechanics of reading, types of reading, reading speed.

UNIT- V

Business correspondence: structure and layout of business letters, enquiry letter and important points, complaint and adjustment letters, complaint letter, important points, sales letter.

Resume writing: elements of resume, preparing a resume, writing a job application letter Presentation Skills: Tips for making presentations.

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Text Books:

1. Koneru. A. (2011). English Language Skills. McGraw Hill

Reference Books:

1. Langan, J. (2010). College writing skills. McGraw-Hill, Eighth Edition.
2. Langan, J., & Jenkins, L. (2010). Ten steps to advancing college reading skills. Townsend Press.
3. Swan, M. (2016). Practical English Usage 4th edition.

Course Outcomes

Upon successful completion of the course, student will be able to:

- Develop listening skills to distinguish between letters and sound to use them effectively in speech during standard communication or debates and group discussions.
- Use dictionary and grammar effectively to overcome errors in reading and writing.
- Frame sentences and effectively use while writing paragraphs, essays, business letters and resumes etc.

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Course No: CE411	Course Title: Environmental Geotechnology	L	P	U
		3	0	3

Course Learning Objectives

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 system and ground remediation technologies

Course Content

UNIT I

Introduction to environmental geotechnology; scope of geo-environmental engineering, multiphase behavior of soil, role of soil in geo-environmental applications, importance of soil physics, soil chemistry, hydrogeology, biological process, sources and type of ground contamination, impact of ground contamination on geo-environment, case histories on geo-environmental problems, environmental cycles & interaction; soil-water-environment interaction; causes of soil pollution; factors governing soil pollutant interaction, soil and ground water pollutants, their sources, nature, composition and polluting effects, physico-chemical aspects of soils contaminated by various pollutants, effects of environment and wastes on the properties of soils.

UNIT II

Waste characteristics; sources and types of wastes; contaminant transport in subsurface: advection, diffusion, dispersion; contaminant transformation: sorption, biodegradation, ion-exchange, precipitation; ground water pollution: pollution of aquifers by mixing of liquid waste; protecting aquifers.

Soil mineralogy characterization and its significance in determining soil behavior, soil-water interaction and concepts of double layer, forces of interaction between soil particles, concepts of unsaturated soil, importance of unsaturated soil in geo-environmental problems, measurement of soil suction, water retention curves, water flow in saturated and unsaturated zone, soil-water contaminant interactions and its implications, factors effecting retention and transport of contaminants.

UNIT III

Evolution of waste containment facilities and disposal practices, site selection based on environmental impact assessment, different role of soil in waste containment, different components of waste containment system and its stability issues, property evaluation for checking soil suitability for waste containment, design of waste containment facilities, site characterization, risk assessment of contaminated site, remediation methods for soil and groundwater, selection and planning of remediation methods, some examples of in-situ remediation.



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UNIT IV

Objectives of waste disposal facilities; site selection criteria for waste disposal; methods of disposal: surface impoundment systems, sub-surface disposal, passive containment systems, landfills.

Landfill: types, requirements, components; site selection; leachate and gas generation; primary and secondary leachate; leachate collection and removal system; gas collection and removal system; landfill liners; compacted clay liners, geosynthetic clay liners, geomembrane liners; landfill cover system; enduses of closed landfills.

UNIT V

Soil remediation technologies: soil washing, electro kinetic remediation, soil vapour extraction, bioremediation, stabilization and solidification, ground water remediation technologies: pump and treat, in-situ flushing, bioremediation, air sparging, reactive well.

Text Books

1. Wentz, C.A. (1995) *Hazardous waste management*. 2nd edn. New York, NY, United States: McGraw-Hill Inc., US.

Reference Books

1. Reddi, L.N., Inyang, H.I. and Reddi/Inyang (2000) *Geoenvironmental engineering: Principles and applications*. New York: Marcel Dekker.
2. Fang, H.-Y. and Daniels, J. (1997) *Introduction to environmental geotechnology*. Boca Raton, NY: CRC Press.

Course Outcomes

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.


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Course No: IMEEVS117	Course Title: Environmental Science	L 2	P 0	U 2
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Course Learning Objectives

- To understand the fundamentals of environment
- To understand the science of interrelationship between the living organisms and their environment
- To understand the relationship between the population and the environment.
- To have an understanding about the land resources, water resources, air resources and their pollution, control methods
- To have an understanding about the waste management.
- To know about the environmental policies and laws.

Course Contents

UNIT-I

Meaning of Environment, Types and components of environment, nature and scope of the subject, Need for environment studies, goals of environmental education, environmental education programs, Man-environment relationship, biogeochemical cycles.

UNIT-II

Concept of ecology, Subdivisions and developmental phases of ecology, Concept of the ecosystem, Structural and functional aspects of ecosystem, Productivity concept of ecosystem, food chains and food webs in ecosystems, Ecological energetics, ecological interactions, Population ecology, Population characteristics, Population dynamics, population regulation.

UNIT-III

Nature and importance of soil, Formation of soil, soil properties, Nutrients in soil soil erosion, contamination of soil, Land use, Waste lands, Desertification. Introduction, properties of water, hydrological cycle, Water resources, waste water of India-its future, Water pollution, Pollution of ground water.

UNIT-IV

Origin of the atmosphere, composition of the air, structure of the atmosphere, Air pollution, Effects of air pollution on human health, flora and fauna, Global effects of air pollution.

UNIT-V

Energy, sources of energy, conventional and non conventional sources of energy, Waste water management, biomedical waste management, Air pollution control, Environmental policies and laws.



Text Books:

- (1) A Text Book of Environment, Agarwal, K.M., Sikdar, P.K and Deb.S.C Mac Millan India Ltd., 2002.

Reference Books:

- (1) A Text Book on Environmental Science, V. Subramanian, Third reprint, Narosa Publishing House, 2005.
- (2) Environment, Raven, Peter H., and Linda R. Berg. 3rd ed., Fort Worth: Harcourt College Publishers, 2001.

Course Outcomes

After successful completion of the course student will be able to

- Understand the natural environment and its relationships with human activities.
- Characterize and analyze human impacts on the environment.
- Integrate facts, concepts, and methods from multiple disciplines and apply to environmental issues.
- Acquire practical skills; devise methodologies for scientific problem-solving, including familiarity with laboratory and field instrumentation.
- Understand and implement scientific research strategies, including collection, management, evaluation and interpretation of environmental data.
- Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments.



Course No: CE419	Course Title: Environmental Systems	L	P	U
		3	0	3

Course Learning Objectives

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 of environmental issues and promote critical awareness among the students.

Course Content

UNIT I

Systems and models: Introduction to the concepts and applications of environmental systems analysis. Application of mathematical programming and modelling to the design.

UNIT II

Planning and management of engineered environmental systems, regional engineered systems and environmental policy.

UNIT III

Economic analysis including benefit - cost analysis and management strategies. Concepts of trade off, non – inferior sets, single and multi-objective optimization. Capacity constrained population growth and decay.

UNIT IV

Practical application to case studies to convey an understanding of the complexity. Introduction to Cyclical Behavior, Cycles in Predator and Prey Populations, coupled hydrology and wildlife systems; species migration

UNIT V

Data collection challenges of actual design practice. Environmental value systems.

Text Books

1. Ford, A., (2010). Modelling the Environment, 2nd Ed, Island Press, Washington, US.
2. Haefner, J.W., (2004). Modelling Biological Systems: Principals and Applications, 2nd Edition, Springer Science + Business Media Inc, New York, US.

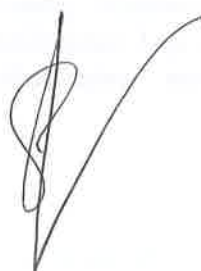
Reference Books

1. Wainwright J, and Mulligan, M., (Eds), (2004). Environmental Modelling: Finding Simplicity in Complexity, John Wiley and Sons Ltd, West Sussex, England
2. Clarke, K.C., Parks, B.O. and Crane, M.P. (2001). *Geographic information systems and Environmental modeling*. Harlow, UK: Upper Saddle River, New Jersey Prentice Hall.
3. Seppelt, R., (2003). Computer-Based Environmental Management, Wiley-VCH



Course Outcomes

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.



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Course No: CE416	Course Title: Hazardous Waste Management	L	P	U
		3	0	3

Course Learning Objectives

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.

Course Content

UNIT I

Types and Sources hazardous wastes; need for hazardous waste management; elements of integrated hazardous waste management and roles of stakeholders and ngos; salient features of indian legislations on management and handling of hazardous wastes, biomedical waste: definition, sources, classification, collection, segregation treatment and disposal. , lead acid batteries, e-waste: waste characteristics, generation, collection, transport and disposal. radioactive waste: definition, sources, low level and high level radioactive wastes and their management, radiation standard by ICRP and AERB.

UNIT II

Hazardous waste generation rates and variation; composition, physical, chemical and biological properties of hazardous wastes; hazardous characteristics; tclp tests; sampling and analysis of hazardous wastes – analytical approach for hazardous waste characterization waste sampling and characterization plan; source reduction of wastes; recycling and reuse.

UNIT III

Handling and segregation of wastes at source: storage and collection of hazardous wastes; need for transfer and transport; transfer stations optimizing waste allocation; compatibility, storage, labeling and handling of hazardous wastes.

UNIT IV

Objectives of waste processing; material separation and processing technologies; biological and chemical conversion technologies; hazardous waste treatment technologies - physical, chemical and thermal treatment of hazardous waste: solidification, chemical fixation, encapsulation, pyrolysis and incineration, solidification and stabilization of hazardous wastes, treatment of biomedical wastes and e-waste.

UNIT V

Waste disposal options; disposal in landfills; site selections, landfill classification; construction and operation of secured landfills; bioreactors; ocean dumping; land disposal; soil remediation. hw reduction, recycling and reuse, regulatory aspects of HWM.

Text Books

1. CPHEEO (2009). *Manual on municipal solid waste management*. New Delhi: Central Public Health and Environmental Engineering Organisation, Government of India.

Reference Books

1. Michael, D., LaGrega, P. L., Buckingham, J. C. (2010). *Environmental Resources Management*. 2nd edn. New York, NY, India: McGraw-Hill International.
2. Worrell, W.A. and Vesilind, A.P. (2010) *Solid waste engineering*. 2nd edn. Stamford, CT, USA: Cengage Learning.

Codes:

1. SP 7(Part 9): 2005: National Building Code of India
2. Handbook of Environmental Protection Act 1986.

Course Outcomes

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.



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Course No	Course Title	L	P	U
HS313	Heritage of India	3	0	3

Learning Objectives

Comprehending the heritage of the nation is a necessary pre condition for the making of conscientious citizenship. Knowledge of the nation's evolution and legacy enables to precisely define one's national self. Hence, this course is designed to serve the objective of enabling the students to take stock of the heritage and cultural evolution of their nation and its syncretic history.

Course Contents:

UNIT I: Indian Culture: An Introduction

Characteristics of Indian culture, Significance of Geography on Indian Culture. Society in India through ages- Ancient period- varna and jati, family and marriage in india, position of women in ancient india, Contemporary period; caste system and communalism. Religion and Philosophy in India: Ancient Period: Pre-Vedic and Vedic Religion, Buddhism and Jainism, Indian philosophy – Vedanta and Mimamsa school of Philosophy.

UNIT II: Indian Languages and Literature

Evolution of script and languages in India: Harappan Script and Brahmi Script. Short History of the Sanskrit literature: The Vedas, The Brahmanas and Upanishads & Sutras, Epics: Ramayana and Mahabharata & Puranas. History of Buddhist and Jain Literature in Pali, Prakrit and Sanskrit, Sangama literature & Odia literature.

UNIT III: A Brief History of Indian Arts and Architecture

Indian Art & Architecture: Gandhara School and Mathura School of Art; Hindu Temple Architecture, Buddhist Architecture, Medieval Architecture and Colonial Architecture. Indian Painting Tradition: ancient, medieval, modern indian painting and odishan painting tradition. Performing Arts: Divisions of Indian classical music: Hindustani and Carnatic, Dances of India: Various Dance forms: Classical and Regional, Rise of modern theatre and Indian cinema.

UNIT IV: Spread of Indian Culture Abroad

Causes, Significance and Modes of Cultural Exchange - Through Traders, Teachers, Emissaries, Missionaries and Gypsies, Indian Culture in South East Asia, India, Central Asia and Western World through ages.

UNIT V: Understand and appreciate the heritage of India in various fields of applied sciences

Applied Sciences: Geography, Astronomy, Mathematics, Physics, Chemistry, Physiology, Medicine, Coinage, Weights and Measures, India's contribution to the world civilizations and the external influences on Indian Heritage

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Text Books

Basham, A.L, The Wonder That was India, Picador, London, 2004.

Reference Books

1. Nehru, Jawaharlal, the Discovery of India, Jawaharlal Memorial Fund, New Delhi, 1999.
2. Thapar, Romila, The History of India, Vol. I, Penguin, New Delhi, 1966
3. Basham, A.L, ed., A Cultural History of India, Penguin, New Delhi, 1988.
4. Jha, D.N, Ancient Indian in Historical Outline, Manohar, New Delhi, 2004.
5. Wolpert, Stanley, an Introduction to India, Penguin, New Delhi, 1994.
6. Mazumdar, R.C, et.al, an Advanced History of India, MUP, Michigan, 1969.
7. Malekandathil, Pius: Maritime India: Trade, Religion and Polity in the Indian Ocean, Primus Books, Delhi, 2010.
8. McPherson, Kenneth: The early Maritime Trade of the Indian Ocean, in: ib.: The Indian Ocean: A History of People and The Sea, OUP, 1993, pp. 16-75.
9. Christie, J.W., 1995, State formation In early Maritime Southeast Asia, BTLV



Course No:CE424	Course Title:Infrastructure Financing	L	P	U
		3	0	3

Course Learning Objectives

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.

Course Content

UNIT I

Definition of infrastructure, Multiplier effects of infrastructure development on economic development of the nation, Sources of financing infrastructure project, Traditional and private investments, Limitations of traditional procurement system of infrastructure Legal frameworks and Incentives for private sector participation in infrastructure development, Rationale for investment in infrastructure, The change from public financing to project finance, Definition of project finance, Difference between project finance and corporate finance, Basic features of project finance, The importance of tax issues in project financing, Long-term financing instruments, Mobilising commercial debt, Subordinated debt, Stand-by loans, Debentures, Export credit, Ordinary equity, Cost of equity issue, Issuing of bonds, Other forms of bonds, Private place of bonds, Preference shares, Warrants, Other financing instruments, Short-term financing instruments.

UNIT II

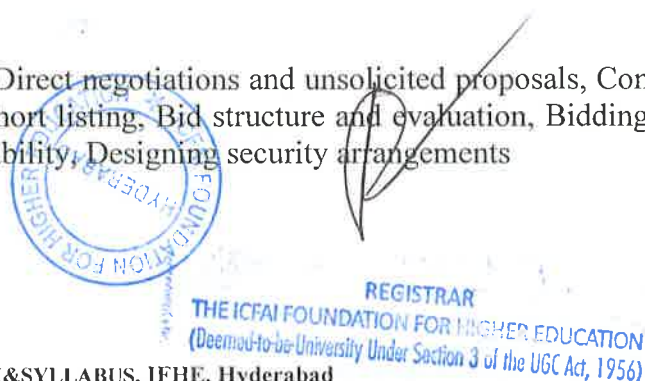
Typical allocation of government funds, Sources of government funds, Methods of procuring projects, Definition and justification of privatization, Types of privatization, Goals of privatization and deregulations, Prerequisites for privatization, Benefits of privatization, World trends in privatization and economic reform, Case study introduction, Concepts and characteristics of PPP, Features of PPP, Benefits of PPP, Types of PPP Models and their contractual structure.

UNIT III

Stakeholders' perspectives: Granting authority, Funders and Concessionaire, Government's role in successful PPP projects, Financial and Economic Appraisal of BOT Projects, VFM evaluation PPP procurement process, Lifecycle of PPP projects, Contractual package of PPP project, Bankable concession agreement, Case study – Procurement process of Indian PPP projects, Price setting, Price adjustment, Specific performance targets, Penalties and bonuses, Public parties' security rights, Duration, termination and compensation, Force majeure and other unforeseen changes, Dispute settlement

UNIT IV

Competitive bidding, Direct negotiations and unsolicited proposals, Competitive negotiations, Prequalification and short listing, Bid structure and evaluation, Bidding rules and procedures Analysis of project viability, Designing security arrangements



UNIT V

role of credit ratings in financing infrastructure projects, Rating frameworks of various national and international credit rating agencies for infrastructure projects in various sector, World bank guarantees, Export credit agencies, and political risk, insurances, financial institutions, insurance and bonding, appraisal, restructuring projects

Text Books

1. Neil S. Grigg (2010). Infrastructure Finance: The Business of Infrastructure for a Sustainable Future. John Wiley & Sons.

Reference Books

1. Tony Merna and Cyrus Njiru (2002). Financing Infrastructure Projects, ,Thomas Telford,
2. Davis (2008).Infrastructure Finance: Trends and Techniques, ,Euromoney books,
3. Dalip Singh Swamy (2000)Securitisation for infrastructure financing, , Asian Institute of Transport Development (New Delhi, India)

Course Outcomes

Upon successful completion of the course students will be able to prepare the project financing plan.


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Course No: CE426	Course Title: Materials , Management and Estimation	L	P	U
		3	0	3

Course Learning Objectives

The objective of the course is to understand basic principles of surveying, Construction Management, construction materials and estimation of quantities.

Course Content

UNIT I

Definitions, methods in levelling; levelling instruments; levelling staff; balancing backsights and foresights; differential levelling, longitudinal & cross section levelling, contouring methods, contour intervals, characteristics and uses of contours, plotting, interpolation of contours, contour gradient, total station surveying working principles.

UNIT II

Construction as industry and its challenges, role of construction management, methods of construction managements, basic requirements of construction management: learning structures, life cycle of construction projects: conceptual planning, analysis and design, procurement, utilization and maintenance. Examples of real projects and its learning requirements.

UNIT III

Introduction to network based project management techniques: defining activities and their interdependence, drawing of network, time and resource estimations, use of network as scheduling techniques, use of network as control techniques i.e. project monitoring.

UNIT IV

Stone as building material, criteria for selection, tests on stones ,deterioration and preservation of stone work, bricks, classification, manufacture of clay bricks, tests on bricks, compressive strength, water absorption, efflorescence, bricks for special use, refractory bricks, cement and concrete hollow blocks ,light weight concrete blocks, code Practices.

Timber ,market forms, industrial timber, plywood, veneer, thermocol, panels of laminates ,steel , aluminium and other metallic materials, manufacturing process of cement, sources of aggregate. Use of admixtures.

UNIT V

Introduction to building plans and estimating quantities of items of works involved in buildings.



Text Books

1. Duggal, S.K. (2013). *Surveying*: Vol. I & II. 4th edn. New Delhi: Tata McGraw-Hill Education.

Reference Books

1. Jha, K.N. (2011). *Construction project management theory and practice*. New Delhi: Pearson Education.
2. Varghese, P.C. (2015). *Building materials*. 2nd edn. New Delhi, India: Prentice-Hall.
3. Datta, B.N. (2016). *Estimating and costing*. 28th edn. New Delhi, India: USB Publishers Distributors.

Course Outcomes

Up on successful completion of the project, the student will be able to understand surveying, construction management techniques, construction materials and estimation of a building project.


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Course No	Course Title	L	P	U
HS314	Modern Political Science	3	0	3

Objectives

- To familiarise the students with the basic ideas of political science.
- To make them thorough in the concepts of political theory.
- To help them understand and distinguish between basic concepts like political theory, political thought and political philosophy.
- To help the students understand and relate the concepts and facts with the political realities of the country and different parts of the world.
- To equip them with the basics of the discipline and help them learn the basic underpinnings of the subject of Political Science.

Unit I Political Theory

Nature, scope and significance of political theory, procedure of different theoretical ideas in political theory, the various traditional and modern theories of political science., theories of origin of the state.

Unit II Political Theory

Concept of Democracy, its types and theories (Elitist, Pluralist and Marxist) relating to it, concept of Development and various views and Perspective relating to it. i.e. Liberal, Marxist, Sustainable Development, Human Development and Gandhian Model of Development, Understanding basic concepts of Justice, distributive justice, multiculturalism and social justice.

Unit III Politics in India

Philosophy of Indian constitutions, introducing the Indian Constitution with a focus on the evolution of it and examining the essence of the Preamble, e Fundamental Rights and Duties of Indian citizens with a study of the significance and status of Directive Principles.

Analyzing the important institutions of the Indian Union: the Executive: President; Prime Minister, Council of Ministers; Governor, Chief Minister and Council of Ministers; The legislature: Rajya Sabha, Lok Sabha, Speaker, Committee System, State Legislature, The Judiciary: Supreme Court and the High Court: composition and functions- Judicial Activism

Unit IV Politics in India

Centre-State Relations with focus on the Legislative, Administrative and Financial Relations., evaluating the Indian Party system – its development and looking at the ideology of dominant national parties, the Electoral Process in India with focus on the Election Commission: Composition, Functions and Role, the challenges to National Integration: Terrorism, Regionalism and Casteism.

Unit V International Relations

Overview about the nature, evolution and scope of international relations, the basic ideas of international relations, the different approaches to the study of International Relations, historical background of the discipline which will help them understand international politics in a better way, basic concepts of International Relations and also develop a preliminary understanding of the global economy, formation, charter and objectives of United Nations and its working on Millennium Development Goals, the working of United Nations in resolving conflict and peacekeeping operations, the international security; Disarmament, Arms Control and Nuclear nonproliferation

Text Books:

1. J.C. Johari – “Principles of Modern Political Science”, Sterling Publishers PVT. Ltd., New Delhi, 2007
2. Perter Harris, “Foundations of Political Science”, Oxford University Press

References:

1. Amal Ray and Mohit Bhattacharya – “Political Theory: Institutions and Ideas” - The World Press Private Ltd., Calcutta, 1988
2. O.P. Gauba – “An Introduction to Political theory” Macmillan India Ltd., 2008.
3. Robert Dahl – “Modern political Analysis.” OUP 2007
4. Prof. A.C Kapoor - “Principles of Political Science”, Sterling Publishers PVT. Ltd., New Delhi, 2005

Course Outcomes:

- Understanding of government institutions, electoral processes, and policies in a variety of countries around the world and the ability to compare the effectiveness or impact of various political arrangements across countries.
- Knowledge of some of the philosophical underpinnings of modern politics and government and the legal principles by which political disputes are often settled.
- Understand the changes in patterns of political behaviour, ideas and structures.
- Assess how global, national and regional developments affect polity and society.
- Develop the ability to make logical inferences about social and political issues on the basis of comparative and historical knowledge.
- Knowledge of key theories and concepts, historical developments, organizations, and modern issues in international relations.


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Course No: CE423	Course Title: Natural Disaster Mitigation and Management	L	P	U
		2	0	2

Course Learning Objectives

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

Course Content

UNIT I

Introduction- natural disasters around the world- natural disaster risk assessment- earth and its characteristics human dimensions of global environment change – disaster mitigation, preparedness, response and recovery comprehensive emergency management early warning systems and disaster preparedness– rehabilitation, vulnerable populations - logistics and services, food, nutrition and shelter -role of UN Red Cross and NGOs.

UNIT II

Introduction and review - natural disasters -principles, elements, and systems - geological-geomorphological aspects- earthquake-geology, seismology, characteristics and dimensions– landslides- human impact on the mountainous terrain and its relationship with rainfall, liquefaction etc- tsunami - nature and characteristics.

UNIT III

Oceanic, atmospheric and hydrologic cycles - severe weather & tornadoes , cyclones, floods and droughts -global patterns - mitigation & preparation – drought – famine- nature and dimensions – drought assessment and monitoring.

UNIT IV

Mapping - modeling, risk analysis and loss estimation – natural disaster risk analysis - prevention and mitigation -applications of space technology (satellite communications, GPS, GIS and remote sensing and information / communication technologies (ICT) in early warning systems, disaster monitoring and support centre–information dissemination, mobile communication – etc.

UNIT V

Community and social organizations – education and training – establishment of capacity building among various stake holders – government - educational institutions – use of multi-media knowledge products for self-education.



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Text Books

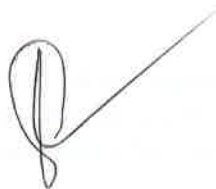
1. Kovach, R.L. (1995). *Earth's fury: An introduction to natural hazards and disasters*. London: Prentice-Hall.

Reference Books

1. Singh, R.B. (2006). *Natural hazards and disaster management: Vulnerability and mitigation*. Jaipur, India: Rawat Publications.
2. Gupta, H.K., Gupta, H. and Academy, I.N.S. (2004). *Disaster management*. Hyderabad, India: University Press.

Course Outcomes

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.



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Course No: IMETA223	Course Title: Professional Communication	L 3	P 0	U 3
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Course Learning Objectives

The course aims at acquiring the students

- to understand various aspects of business communication.
- to gain knowledge regarding the various ways of assembling information,
- to write clearly and concisely and to present information in an effective manner
- to train them for oral presentation.

Course Contents

UNIT-I

Basics of Communication process, Features of Technical communication, differences between general purpose communication and technical communication, Verbal and non verbal communication and their differences, understanding and overcoming barriers of communication.

UNIT-II

Definition and characteristic features of a technical report, Classification of reports, Structure and Layout of report, Various elements of a report and features of each of the elements, Various ways of collection of data, principles of preparing a questionnaire, Practicing questionnaire preparation, Organization of materials, Preparation of the outline, Formatting techniques.

UNIT-III

Elements of effective writing, Mechanics of writing, Writing styles and use of suitable words and phrases for technical writing according to the context, Revision practices, Principle steps of writing a précis, making notes, abstract and executive summary.

UNIT-IV

Oral presentation features, Use of illustrations, tables and visual aids in presentation and technical writing, Non-verbal aspects in oral presentations, Reading skills for different purposes.

UNIT- V

Distinctive features of memo reports and letter reports, Preparing Notice, Minutes of meeting Brochures, Instructions manual and User's Manual, Understand the difference between Preparing Notice, Minutes of meeting Brochures, Instructions manual and User's Manual, Business Letter formats, layouts and its significance.


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Text Books:

1. Koneru. A. (2008). *Professional Communication*. McGraw Hill

Reference Books:

1. Omfort, Jeremy et al (1984). *Business Report in English*. Cambridge University Press
2. Gerson & Gerson (2000). *Technical Writing Process and Product*. Pearson Education.

Course Outcomes

Upon successful completion of the course, student will be able to:

- Understand the aspects of verbal and non verbal communication in its significance in professional and personal communication
- Utilize their knowledge of report writing and write appropriate technical reports.
- Make oral presentations
- Distinguish between various business communicational formats and use them appropriately.



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Course Code: MSE 607

L - 4 P - 2 U - 6

Course Title: Project Management

Prerequisite: NIL

Course content:

Unit I

Projects in Contemporary Organizations: The Definition of a Project, The Project Life Cycle , The Structure of This Text, project initiation, Strategic Management and Project Selection, Project Management Maturity, Project Selection and Criteria of Choice , The Nature of Project Selection Models, Types of Project Selection Models, Analysis under Uncertainty—The Management of Risk, Comments on the Information Base for Selection, Project Portfolio Process, Project Proposals, Implementing Strategy through Projects at Blue Cross/Blue Shield Project Selection for Spent Nuclear Fuel Cleanup, Simulating the Failure of California's Levees, Using a Project Portfolio to Achieve 100% On-Time Delivery at Décor Cabinets

Unit II

The Project Manager , Project Management and the Project Manager, Special Demands on the Project Manager, Selecting the Project Manager, Problems of Cultural Differences , Impact of Institutional Environments, Multicultural Communications and Managerial Behavior, Case Studies, Negotiation and the Management of Conflict, The Nature of Negotiation, Partnering, Chartering, and Scope Change, Conflict and the Project Life Cycle, Some Requirements and Principles of Negotiation , Selling New Area Codes to Consumers Who Don't Want Them , The Project in the Organizational Structure, The Project as Part of the Functional Organization , Pure Project Organization, The Matrix Organization , Mixed Organizational Systems , Choosing an Organizational Form, Two Special Cases—Risk Management and The Project Office, The Project Team, Human Factors and the Project Team , Case Studies.

Unit III

Project Activity Planning: Initial Project Coordination and the Project Plan, Systems Integration, The Action Plan, The Work Breakdown Structure and Linear Responsibility Chart , Interface Coordination through Integration Management, Budgeting and Cost Estimation , Estimating Project Budgets , Improving the Process of Cost Estimation, Scheduling, Network Techniques: PERT (ADM) and CPM (PDM), Risk Analysis Using Simulation with Crystal Ball case Studies.

Unit IV

Resource Allocation: Critical Path Method—Crashing a Project, The Resource Allocation Problem, Resource Loading Resource Leveling, Constrained Resource Scheduling, Multi-project Scheduling and Resource Allocation, Goldratt's Critical Chain, Project Execution, Monitoring and Information Systems, The Planning-Monitoring-Controlling Cycle, Information Needs and Reporting, Earned Value Analysis Computerized PMIS (Project Management Information Systems) associated case studies.




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Unit V

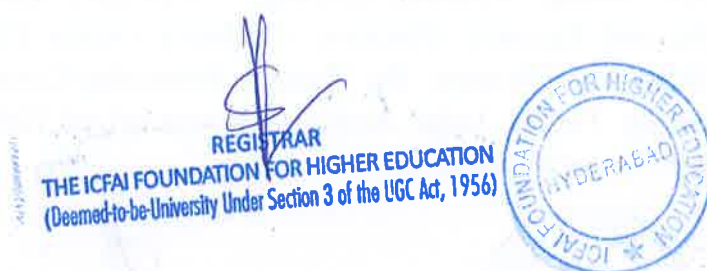
Project Control: The Fundamental Purposes of Control, Three Types of Control Processes, The Design of Control Systems, Control: A Primary Function of Management , Control of Change and Scope Creep, Laser Processors, Project Auditing, Purposes of Evaluation—Goals of the System, The Project Audit Construction and Use of the Audit Report, The Project Audit Life Cycle, Some Essentials of an Audit/Evaluation, Measurement Lessons from Auditing, Client/Server and Open Systems Projects, Project Termination, The Varieties of Project Termination, When to Terminate a Project, The Termination Process , The Final Report—A Project History , A Final Note , Nucor's Approach to Termination by Addition Terminating the Superconducting Super Collider Project

Text Book

R.J. Meredith and Samuel J.M., Jr., Project Management A Managerial Approach, 7th Edition, Wiley Publications. USA, 2009.

Reference Books

1. E. Larson, and C. Gray, Project Management: The Managerial Process with MS Project, The McGraw-Hill, 2002
2. T. Peter, The Lazy Project Manager: How to Be Twice As Productive and Still Leave the Office Early, Infinite ideas limited, Oxford, UK, 2009.



Course No: IMEECON214	Course Title: Principles of Economics	L 3	P 0	U 3
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Course Learning Objectives

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.

Course Content

- Introduction to Economics
- Application of Supply & Demand & Elasticity
- Demand and Consumer Behaviour
- Production & Business Organization
- Analysis of Costs
- Input Pricing by marginal productivity
- Perfectly Competitive Markets
- Imperfect Competition and its polar case of monopoly
- Oligopoly and Monopolistic Competition
- Externalities, Public Goods & Imperfect Information
- Macroeconomic concerns and its components
- GDP, Growth, Unemployment & Inflation
- Multiplier, Fiscal Policy at work
- Monetary Policy at Work and Money Supply.
- Open Economy

Text Books

1. Principles of Economics, Case E. Karl & Fair C., Pearson Education, 6th Edition, 2002.

Reference Books

1. Economics, Samuelson & Nordhus, TMH, 16th Edition, 1998.
2. Principles of Economics, Lipsey, RG & K.A. Chrystal, Oxford University Press, 9th Edition, 1999



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Course No: IMEMGTS224	Course Title: Principles of Management	L 3	P 0	U 3
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Course Learning Objectives

The course aims at acquainting the students with various aspects of modern management. During the past two decades a revolution has taken place in the area of management. The new era is one in which entrepreneurship; innovation & technology are seen as the backbone of management. The emphasis is on the modern management essentials, drawing up from the earlier principles & practices, so as to enable the students to be familiar with the basic concepts of management when they enter the professional world.

Course Content

- Introduction to Management: Science, Theory & Practice
- Management & Society: Social Responsibility and Ethics
- Essentials of Planning
- Setting Objectives
- Strategies, Policies & Planning Premises
- Decision- Making
- The Nature of Organizing
- Organizational Structure: Departmentation
- Line/ Staff Authority, Empowerment, & Decentralization
- Managing Change through Manager and Organization Development
- Human Resources Management and selection
- Performance Appraisal & Career Strategy
- Motivation
- Leadership
- Communication
- The System & Process of Controlling
- Control Techniques
- Marketing Management
- Production & Operations Management
- Information Technology
- International Management

Text Books

1. "Essentials of Management", Koontz H. and Weihrich H., 7th edition, Mcgraw Hill Int. ed., 2007.

Reference Books

1. "Management, Principles and Practices for Tomorrow's Leaders", Gary Dessler, 3rd edition, Prentice Hall, 1998.
2. Engineering Management, Fraidoon Mazda, 1st edition, Addison-Wesley, 1999



Course No: CE422	Course Title: Project Planning and Management	L	P	U
		3	0	3

Course Learning Objectives

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.

Course Content

UNIT I

Construction as industry and its challenges, role of construction management, methods of construction managements, basic requirements of construction management: learning structures, life cycle of construction projects: conceptual planning, analysis and design, procurement, utilization and maintenance. Examples of real projects and its learning requirements.

UNIT II

Introduction to network based project management techniques: defining activities and their interdependence, drawing of network, time and resource estimations, use of network as scheduling techniques, use of network as control techniques i.e. project monitoring.

UNIT III

Stages of awarding contract, types of contract, contract documents, arbitration and settlement of disputes, contract laws and handling of contracts, commissioning of project.

UNIT IV

Construction technology: construction of superstructure and substructures, quality control, various items of construction: earthwork, excavation. earth- moving, drilling, blasting, dewatering, foundation, finishing items, painting, flooring, brick works, door, windows, examples of construction of structures such as buildings, bridges, roads, tunnels, industrial structures, construction safety.

UNIT V

Basic concepts of resource management-class of labour - labour productivity -material management functions - inventory management -project cost management.

Text Books

1. Jha, K.N. (2011). *Construction project management theory and practice*. New Delhi: Pearson Education.
2. Sengupta, B. and Guha, H. (1995). *Construction management and planning*. New Delhi: Tata McGraw-Hill.

Reference Books

1. Sharma, S.C. (2008). *Construction equipment and its management*. 6th edn. New Delhi: Khanna Publishers.

Course Outcomes

Upon completing the course, the students will be skilled to plan, control and execute the real time projects . It will increase the employment opportunities.

Course No: CE425	Course Title: Policies, Reforms, Law and Risk Management in Infrastructure Projects	L	P	U
		3	0	3

Course Learning Objectives

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

Course Content

UNIT I

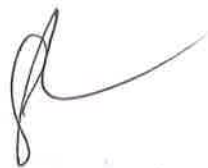
Constitutional law, allocation of jurisdiction over different infrastructure sectors between the Centre and State, law making powers, Administrative Law, Role of Centre and State in policy formulation, Central funding of infrastructure projects, central oversight and interference, Investment requirements, non ideological factors leading to commercialization and privatisation of infrastructure, from socialism to market driven economy, legal framework for private sector participation, modes of Public Private Partnership (PPP).

UNIT II

Settlements through the courts and Alternate Dispute, Resolution (ADR), the judiciary, Alternative Dispute Resolution, the Indian Arbitration and Conciliation Act 1996, Contract law, property Law, Company Law, Competition Act 2002, MRTP Act, Competition Act 2002, , General Framework on environmental regulation and guidelines, Coastal Zone Management Regulation, Forest (Conservation) Act , Environmental Impact Assessment, Land Acquisition , Rehabilitation and resettlement.

UNIT III

Theories of regulation, genesis of Independent regulation, evolution of regulation in different jurisdictions, Design and structure of regulators, scope and functions, regulatory process, and regulatory autonomy and accountability, regulatory predictability and certainty, evolution of the power sector reforms, polices, National Electricity policy, new legal framework the state electricity boards, licensing framework, Provisions Relating to and working of Electricity Regulatory Commission- structure, role and functions Reforms, policies and legal framework, New Exploration Licensing Policy (NELP), production sharing contracts, the new Petroleum Regulatory and Natural Gas Board Act – the emerging regulatory reforms Law, policy and reforms relating to Airports, Railways, Road , Port/TAMP and an overview of coastal shipping and Inland Water Transport policy




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UNIT IV

Main Features of the infrastructure projects, Infrastructure projects and economic development, Types of Infrastructure projects, Commercial Projects, Basic or Economic Projects, Social Projects Technical Feasibility, Economic Feasibility, Social Feasibility, Environmental Feasibility Political Risk, Sovereign Risk, Operational Risk, Financial Risk, Foreign Exchange Risk, Environmental Risk in case of power projects, Gas power projects.

UNIT V

Credit Guarantee by Financial Institutions, International Financial Institutions and Credit Guarantee, Role of Multilateral Investment Guarantee Agency (MIGA) and areas of risk coverage Forward Contracts, Future Contracts, Valuation of forward and future contract Options, Valuation of options using Black Scholes model Energy Derivatives, Weather Derivatives, Carbon Trading, Need for Real Options in Infrastructure Projects

Text Books

- 1) Jeffrey Delmon (2011). *Public-Private Partnership Projects in Infrastructure-An essential Guide for policy makers*, Cambridge University Press.

Reference Books

- 1) Dr Tony Merna and Cyrus Njiru *Financing Infrastructure Projects*, , Thomas Telford Publishing
- 2) I.P Massey (2008). *Administrative Law*, Lucknow: Eastern Book Company.
- 3) D D Basu (2009). *The Constitutional Law of India*, New Delhi: Lexis Nexis.

Course Outcomes

Up on successful completion of the project, the student will be able to understand Infrastructure sectoral policies 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



Course No: HS316	Course Title: Professional Ethics	L	P	U
		3	0	3

Learning Objectives

- To create an awareness on Ethics as applied in Engineering and Human Values
- Understand what morality is and how it connects to professional ethics
- Determine what characterizes a professional and distinguishes one from a nonprofessional

Course Content

UNIT I

Morals, values and ethics, integrity, work ethic, service learning, civic virtue, respect for others, living peacefully, caring, sharing, honesty, courage, valuing time, co-operation, commitment, empathy, self-confidence, character, spirituality.

UNIT II

Senses of 'Engineering Ethics', variety of moral issues, types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, consensus and controversy, models of professional roles, theories about right action, self-interest, customs and religion, uses of ethical theories.

UNIT III

Engineering as experimentation, engineers as responsible experimenters, codes of ethics, a balanced outlook on law, the challenger case study.

UNIT IV

Safety and risk, assessment of safety and risk, risk benefit analysis and reducing risk, the Three Mile Island and Chernobyl case studies. Collegiality and loyalty, respect for authority, collective bargaining, confidentiality, conflicts of interest, occupational crime, professional rights, employee rights, Intellectual Property Rights (IPR), discrimination.

UNIT V

Multinational corporations, environmental ethics, computer ethics, weapons development, engineers as managers, consulting engineers, engineers as expert witnesses and advisors, moral leadership, sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers(India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE), India, etc.

Text Books

1. Martin, M.W. and Schinzinger, R. (2004). *Ethics in engineering*. 4th edn. Boston, MA, USA: McGraw Hill Higher Education.
2. Govindarajan, M., Natarajan, S. and Senthilkumar, V.S. (2004). *Engineering ethics*. New Delhi, India: Prentice-Hall of India Pvt.

Reference Books

1. Fleddermann, C.B. (2011). *Engineering ethics*. 4th edn. Boston, MA, USA: Prentice Hall.
2. Harris, J.C.E., Rabins, M.J., Pritchard, M.S., James, R. and Englehardt, E. (2013). *Engineering ethics: Concepts and cases*. 5th edn. Boston, MA, USA: Wadsworth Cengage Learning.

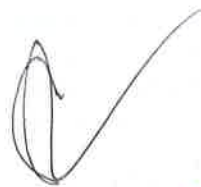


3. Boatright, J.R. (2011). *Ethics and the conduct of business*. Boston, MA, USA: Pearson College Div.
4. Seebauer, E.G. and Barry, R.L. (2010). *Fundamentals of ethics for scientists and engineers*. New York, NY, USA: Oxford University Press.

Learning Outcomes

Upon successful completion of the course student will be able to:

- Choose their own personal, social, moral and spiritual values and be aware of practical methods for developing and deepening
- Assess their own ethical values and the social context of problems
- Identify an ethical issue and analyze that issue in relationship to the specific topic of study or discipline



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Course No: HS312	Course Title: Introduction to Psychology	L	P	U
		3	0	3

Learning Objectives

- To familiarize the students with type concepts of mind processes, motives, reactions, feelings, motivation
- To inculcate group thinking
- To develop skills like conflict resolution, crisis management

Course Content

UNIT I

Introduction: Definition of psychology; historical antecedents of psychology and trends in the 21st century; psychology and scientific methods; psychology in relation to other social sciences and natural sciences; application of psychology to societal problems.

Methods of psychology: Types of research, descriptive, evaluative, diagnostic and prognostic; methods of research: survey, observation, case-study and experiments; characteristics of experimental design and non-experimental design, quasi-experimental designs; focussed group discussions, brain storming, grounded theory approach.

UNIT II

Development of Human Behaviour: Growth and development; principles of development, role of genetic and environmental factors in determining human behaviour; influence of cultural factors in socialization; life span development, characteristics, development tasks, promoting psychological well-being across major stages of the life span.

Sensation, attention and perception: Sensation; concepts of threshold, absolute and difference thresholds, signal-detection and vigilance; factors influencing attention including set and characteristics of stimulus; definition and concept of perception, biological factors in perception; perceptual organization-influence of past experiences, perceptual defence-factors influencing space and depth perception, size estimation and perceptual readiness; the plasticity of perception; extrasensory perception; culture and perception, subliminal perception.

UNIT III

Learning: Concept and theories of learning (behaviourists, gestaltist and information processing models); the processes of extinction, discrimination and generalization; programmed learning, probability learning, self-instructional learning, concepts; types and the schedules of reinforcement, escape, avoidance and punishment, modeling and social learning.

Memory: Encoding and remembering; short term memory, long term memory, sensory memory, iconic memory, echoic memory: the multistore model, levels of processing; organization and mnemonic techniques to improve memory; theories of forgetting: decay, interference and retrieval failure: metamemory; amnesia: anterograde and retrograde.

Motivation and emotion: Psychological and physiological basis of motivation and emotion; measurement of motivation and emotion; effects of motivation and emotion on behaviour; extrinsic and intrinsic motivation; factors influencing intrinsic motivation; emotional competence and the related issues.

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UNIT IV

Thinking, problem solving: Piaget's theory of cognitive development; concept formation processes; information processing, reasoning and problem solving, facilitating and hindering factors in problem solving, methods of problem solving: creative thinking and fostering creativity; factors influencing decision making and judgment; recent trends.

Intelligence and aptitude: Concept of intelligence and aptitude, nature and theories of intelligence - Spearman, Thurstone, Gullford Vernon, Sternberg and J.P; Das; emotional intelligence, social intelligence, measurement of intelligence and aptitudes, concept of IQ, deviation IQ, constancy of IQ; measurement of multiple intelligence; fluid intelligence and crystallized intelligence.

UNIT V

Personality: Definition and concept of personality; theories of personality (psychoanalytical, sociocultural, interpersonal, developmental, humanistic, behaviouristic, trait and type approaches); Measurement of personality (projective tests, pencil-paper test); The Indian approach to personality; training for personality development; latest approaches like big 5 factor theory; the notion of self in different traditions.

Work Psychology and Organisational Behaviour: Personnel selection and training; use of psychological tests in the industry; training and human resource development; theories of work motivation, Herzberg, Maslow, Adam Equity theory, Porter and Lawler, Vroom; Leadership and participatory management; advertising and marketing; stress and its management; ergonomics; consumer psychology; managerial effectiveness; transformational leadership; sensitivity training; power and politics in organizations.

Text Books

1. Passer, M.W. and Smith, R.E. (2010). *Psychology: The science of mind and behavior*. 4th edn. Boston, MA, USA: McGraw-Hill Higher Education.
2. Pareek, U. and Khanna, S. (2012). *Understanding organizational behaviour*. 3rd edn. New Delhi, India: Oxford University Press.

Reference Books

1. Luthans, F. (2010). *Organizational behavior: An evidence-based approach*. 12th edn. New York, NY, USA: McGraw Hill Higher Education.
2. Morris, C.G. and Maisto, A.A. (2004). *Psychology: An introduction*. 12th edn. Harlow, United Kingdom: Prentice Hall.

Learning Outcomes

Upon successful completion of the course student will be able to:

- Use critical thinking to evaluate and interpret evidence, and to apply psychological concepts, theories, and research findings to individual, social, and cultural issues
- Apply basic research methods in psychology, with sensitivity to ethical principles
- Demonstrate effective communication skills following professional conventions in psychology appropriate to purpose and context
- Understand the complexity of sociocultural diversity and societal inequality in the inquiry and analysis of psychological issues

Course No	Course Title	L	P	U
HS315	Public Administration	3	0	3

Learning Objectives

The course on Public Administration/Management has following objectives:

1. Understand the concept of public administration/ management/organization
2. Understand the evolution of the concept of public administration and its importance
3. Understand the role of government
4. Understand the role and core functions of public manager
5. Understand the structure of government /organizations
6. Create understanding about the skills required by the public manager in imparting duties
7. Understand the changing role of government and role of public managers.

Course Contents:

Unit I

Introduction:

Meaning, scope, and significance of Public Administration, Wilson's vision of Public Administration, Evolution of the discipline and its present status, New Public Administration, Public Choice approach, Challenges of liberalization, Privatisation, Globalisation, Good Governance: concept and application, New Public Management

Unit II

Administrative Thought, Scientific Management and Scientific Management movement, Classical Theory, Weber's bureaucratic model – its critique and post-Weberian Developments, Dynamic Administration, Human Relations School, Functions of the Executive, Simon's decision-making theory, Participative Management.

Unit III

Administrative Behaviour, Process and techniques of decision-making , Communication; Morale Motivation Theories – content, process and contemporary, Theories of Leadership: Traditional and Modern

Organisations - Theories – systems, contingency, Structure and forms:ministries & departments, corporations, companies, boards, commissions, ad hoc and advisory bodies, headquarters and field relationships, regulatory authorities, public-private partnerships.

Unit IV

Accountability and control - Concepts of accountability and control; Citizen and Administration, Legislative, Executive and Judicial control over administration, Role of media, interest groups & voluntary organizations, Civil society, Citizen's Charters, Right to Information, Social audit.



Unit V

Administrative Law - Meaning, scope, and significance, Dicey on Administrative law, Delegated legislation, Administrative Tribunals.

Comparative Public Administration - Historical and sociological factors affecting administrative systems, Administration and politics in different countries, Current status of Comparative Public Administration, Ecology and administration, Riggsian models and their critique,

Techniques of Administrative Improvement - Organisation and methods, Work-study and work management, Management aid tools like network analysis, MIS, PERT, CPM, e-governance and information technology.

Text Book:

1. Baker, R.J.S., 1972, Administrative Theory and Public Administration, Hutchinson University Library, London.
2. Bhattacharya, Mohit, 1998, New Horizons of Public Administration, Jawahar Publishers & Distributors, New Delhi.

References:

1. Bertram, M. Gross, 1964, The Managing of Organisations, The Administrative Struggle, The Free Press of Glencoe, CollierMacmillan., London.
2. Denhardt, Robert B. and Joseph W. Grubbs, 2003, Public Administration: An action Orientation, Fourth Edition, Thomson (Wadsworth), Canada.
3. Prasad, D. Ravindra, V.S. Prasad and P. Satyanarayan, 2004, Administrative Thinkers (Ed), Sterling Publishers, New Delhi.
4. Pugh, D.S., 1985, Organisation Theory: Selected Readings (Ed), Penguin Books, Middlesex, England.
5. Sharma, M.P. and B.L. Sardana, 1988, Public Administration in Theory and Practice, Kitab Mahal, New Delhi.
6. Srivastava, Om Prie, 1991, Public Administration and Management, The Broadening Horizons, Volume 1, Himalaya Publishing House, Delhi

COURSE OUTCOMES:

- To understand the nature and scope of Public Administration;
- To appreciate the methodological pluralism and synthesizing nature of knowledge in Public Administration;
- To comprehend the changing paradigms of Public Administration;
- To acquaint with the theories, approaches, concepts and principles of Public Administration;
- To understand the administrative theories and concepts to make sense of administrative practices.
- To Understand public administration theory and concepts from multiple perspectives

Course Code: MSE 507

L - 4 P - 2 U - 6

Course Title: Quality Engineering & Management

Prerequisite: NIL

Course content:

Unit I

Basic Concept of Quality Costs: Fitness for Use, Quality Characteristics, Parameters of Fitness for use, Definition of quality and its meaning and importance in industry, Control and Quality control, Quality Tasks, Quality functions, The system Concept, Quality systems, quality assurance and ISO 9000 quality system standards, Quality costs concept, Quality cost categories, Examples of Quality cost studies, Securing the Cost figures, Pareto Analysis, Cost reduction Programs and economics of quality. Environmental, safety and health management policies.

Unit II

Control charts: Statistical Tools in Quality control, The concept of variation, Tabular Summarization of Data, Frequency distribution, Graphical Summarization of Data: The Histogram, Quantitative methods of summarizing data: Numerical Indices, Probability distributions : General, The normal Probability distribution, The normal curve and Histogram Analysis, The causes of variation, statistical aspect of control charting, concept of rational subgrouping and detecting patterns on the control charts, For variables and attributes: X and R, X and S, p, np, c and u charts, specification and tolerances, natural tolerance limits, specification limits, process capability ratio analysis and narrow limit gauging

Unit III

Basic statistical concepts: Descriptions of Binomial, Poisson and Normal distribution with practical examples basics of sampling distribution, Acceptance Sampling: Principle of acceptance sampling, Acceptance sampling by attributes: single multiple and sequential sampling plans, Lot quality protection and average outgoing quality protection, Acceptance sampling by variables sampling plans of process parameters.

Unit IV

Total quality Management: Basic concepts of TQM, historical review, leadership, role of senior management, quality statements, plans for process parameters, Modern Quality Management Techniques: TQM tools: Benchmarking, QFD, Taguchi quality loss function TPM, FMEA, Lean Manufacturing continuous improvement techniques, JIT systems, pareto diagrams, cause and effect diagrams, scatter diagram, run charts, affinity diagrams, inter-relationship diagram, process decision program charts.

Unit V

Introduction to safety: Need of safety, Safety-Related facts and Figures, Engineers and safety, Product Hazard classification and common mechanical injuries, Statute, common, Administrative and liability laws and product liability, Safety analysis methods: Cause and Effect Diagram, Fault Tree Analysis, Control Charts, Markov Method, Failure Modes and Effect Analysis, Hazard and Operability Analysis, Technique of Operation review, Job Safety Analysis,

Safety Management and Costing: Safety Management principles and developing a safety program plan, Safety department functions, Functions and Qualifications of Safety Professionals: Safety Manager, Safety Engineer, Safety Committees and Motivating Employees to Work Study, A Manufacturer's Losses or Cost due to an Accident Involving its product, Safety Cost Estimation Methods and Models : The Simonds Method, The Heinrich Method, Total Safety Cost Estimation Model

Textbook(s)

1. Joseph M. Juran, Frank M. Gryna, Quality planning and Analysis, TMH, New Delhi, 1993.
2. Acheson Johnston Duncan, Quality Control and Industrial Statistics, 5th Edition, Irwin, 1986

Reference book(s) :

1. R P Mohanty, R.R. Lakhe, A handbook on TQM, Jaico, New Delhi, 2006.
2. L. Grant, Eugene Statistical Quality Control, 7th edition, McGraw-Hill, New York, 1996.
3. L. S. Srinath, Reliability Engineering, 3rd edition, Affiliated East west press, 1991.
4. Kanishka Bed, Quality Management, Oxford University Press, New Delhi, 2006.
5. DC Montgomery , Introduction to SQC, 6th edition , Wiley, New Delhi, 2009
6. A Mitra, Fundamentals of quality control and improvement, John Wiley & Sons, New Jersey, 2008
7. B.S. Dhillon, Reliability, Quality, and Safety for Engineers, CRC Press, New York, 2005.




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Course Code: MSE 618

L - 4 P - 2 U - 6

Course Title: Reliability Engineering & Management

Prerequisite: NIL

Course content:

Unit I

Reliability analysis and prediction: Definition. Causes and types of failures. Reliability expressions for constant, increasing and decreasing hazard rates. Data Analysis, Probability plots for various distributions (exponential, Weibull, Normal and Gamma). Series, parallel, series-parallel, standby and k-outof-m modeling. System reliability evaluation techniques, including methods of bounds, decomposition and transformation techniques. Single and Multiple variable inversion techniques for minimizing system reliability expression. Analysis of dependent failures. Reliability computations using similar and dissimilar stress-strength distributions (exponential, Weibull, normal and Gamma). Time dependent stressstrength distributions, fatigue failures, Recent trends in reliability evaluation techniques.

Unit II

Statistical methods in reliability: Probability Theory, Statistical definitions, Combinatorial properties, Conditional probability and its use in the analysis of dependent failures. Discrete and continuous random variables and associated distributions, moments. Markov Models, Poisson process. Several random variables, moment generating functions. Estimation Theory, several estimators and their properties. Solution of differential equations arising in reliability studies, Laplace transform methods. Random number generation, Monte Carlo simulation.

Unit III

Reliability design: Functional Designs, design simplifications, de-rating and human factors and optimal design selection. Allocation problem, reliability, redundancy and optimal reliability and redundancy allocation. Failure and repair rate allocation. Various design problems and their relevant solution techniques. Optimal maintenance strategies. Spare parts provisioning and policies. Optimal manpower planning.

Unit IV

Environmental testing and reliability demonstration: Failure caused due to environmental conditions; dry heat humidity, salt mist, rain, shock, bump, method of environmental stress screening (ESS), failure modes and their relationship with environmental stress models relating failure rate with environment stress, reliability demonstration through accelerated testing, burn-in procedure and its optimization. Reliability growth. Models of reliability growth.

Unit V

Reliability management: Product reliability, time dependency, reliability considerations in production, concept of productivity, prevention of degradation inherent product reliability. Lot control piece parts, control of measurement and test equipment tools control, raw material control, failure reporting system, corrective action coordination, Data collection and control,

Course Code: MSE 606

L - 4 P - 2 U - 6

Course Title: Supply chain Management

Prerequisite: NIL

Course content:

Unit I

Understanding the Supply Chain: Definition, objective, Importance of Supply Chain Decisions, Decision Phases in a Supply Chain Process View of a Supply Chain, Supply Chain Performances: Achieving Strategic Fit and Scope: Competitive and Supply Chain Strategies, Achieving Strategic Fit, Expanding Strategic Scope, Supply Chain Drivers and Metrics: Drivers of Supply Chain Performance, Framework for Structuring Drivers, Obstacles to Achieving Fit.

Unit II

Designing Distribution Networks and Applications to e-Business: The Role of Distribution in the Supply Chain, Factors Influencing Distribution Network Design, Design Options for a Distribution Network, E-Business and the Distribution Network, Distribution Networks in Practice. Network Design in the Supply Chain, The Role of Network Design in the Supply Chain, Factors Influencing Network Design Decisions, Framework for Network Design Decisions, Models for Facility Location and Capacity Allocation, The Role of IT in Network Design, Network Design Decisions in Practice, Network Design in an Uncertain Environment, The Impact of Uncertainty on Network Design, Discounted Cash Flow Analysis, Representations of Uncertainty, Evaluating Network Design Decisions Using Decision Trees AM Tires: Evaluation of Supply Chain Design Decisions Under Uncertainty, Risk Management and Network Design, Making Supply Chain Decisions Under Uncertainty in Practice.

Unit III

Demand Forecasting in a Supply Chain: The Role of Forecasting in a Supply Chain, Characteristics and components of Forecasts, Forecasting Methods, Basic Approach to Demand Forecasting, The Role of IT in Forecasting, Risk Management in Forecasting, Forecasting in Practice, Aggregate Planning in a Supply Chain, The Role of Aggregate Planning in a Supply Chain, The Aggregate Planning Problem and strategies, Aggregate Planning Using Linear Programming, The Role of IT in Aggregate Planning, Implementing Aggregate Planning in Practice Planning Supply and Demand in a Supply Chain, Managing Predictable Variability, Responding to Predictable Variability in a Supply Chain, Managing Supply, Managing Demand, Implementing Solutions to Predictable Variability in Practice

Unit IV

Managing Economies of Scale in a Supply Chain: The Role of Cycle Inventory in a Supply Chain, Economies of Scale to Exploit Fixed Costs and Quantity Discounts, Short-Term Discounting: Trade Promotions, Managing Multiechelon Cycle Inventory, Estimating Cycle Inventory-Related Costs in Practice Cycle Inventory, Managing Uncertainty in a Supply Chain: Safety Inventory, The Role of Safety Inventory in a Supply Chain, Determining Appropriate Level of Safety Inventory, Impact of Supply Uncertainty on Safety Inventory, Impact of

Aggregation on Safety Inventory, Impact of Replenishment Policies on Safety Inventory, Managing Safety Inventory in a Multiechelon Supply Chain, The Role of IT in Inventory Management, Estimating and Managing Safety Inventory in Practice, Determining the Optimal Level of Product Availability, The Importance of the Level of Product Availability, Factors Affecting Optimal Level of Product Availability, Managerial Levers to Improve Supply Chain Profitability, Setting Product Availability for Multiple Products Under Capacity Constraints, Setting Optimal Levels of Product Availability in Practice

Unit V

Transportation in a Supply Chain: The Role of Transportation in a Supply Chain, Modes of Transportation and Their Performance Characteristics, Transportation Infrastructure and Policies, Design Options for a Transportation Network, Trade-Offs in Transportation Design, Tailored Transportation, The Role of IT in Transportation, Risk Management in Transportation, Managing cross-functional drivers in a supply chain: Sourcing Decisions in a Supply Chain, The Role of Sourcing in a Supply Chain In-House or Outsource, Third- and Fourth-Party Logistics Providers, Supplier Scoring and Assessment, Supplier Selection-Auctions and Negotiations, Contracts and Supply Chain Performance, Design Collaboration, The Procurement Process, Sourcing Planning and Analysis, Pricing and Revenue Management in a Supply Chain, The Role of Pricing and Revenue Management in a Supply Chain, Pricing and Revenue Management for: Multiple Customer Segments, for Perishable Products, for Seasonal Demand, for Bulk and Spot Contracts, The Role of IT in Pricing and Revenue Management, Using Pricing and Revenue Management in Practice, Information Technology in a Supply Chain, The Role of IT in a Supply Chain, The Supply Chain IT Framework, Customer Relationship Management, Internal Supply Chain Management, Supplier Relationship Management, The Transaction Management Foundation, The Future of IT in the Supply Chain, Risk Management in IT, Supply Chain IT in Practice, Coordination in a Supply Chain, Lack of Supply Chain Coordination and the Bullwhip Effect, The Effect on Performance of Lack of Coordination, Obstacles to Coordination in a Supply Chain, Managerial Levers to Achieve Coordination, Building Strategic Partnerships and Trust Within a Supply Chain, Continuous Replenishment and Vendor-Managed Inventories, Collaborative Planning, Forecasting, and Replenishment (CPFR), The Role of IT in Coordination, Achieving Coordination in Practice

Textbook(s)

1. S. Chopra, P. Meindl, D.V. Kalra, Supply Chain Management, 5th edition, Pearson Prentice Hall, New Delhi, 2009.
2. Jeremy F. Shapiro, Modeling the Supply Chain, 2nd Edition, USA, 2007



Reference book(s)

1. A. R. Ravindran, D. P. Warsing Jr. Supply Chain Engineering: Models and Applications, CRC Press, New York, 2012.
2. R.P Mohanty and S.G Desmukh Supply chain Management, 1st edition, Theories and practices Wiley dremtech Publishers, New Delhi, 2004.
3. R.P Mohanty and S.G Desmukh. Indian Case studies in supply chain management and other learning recourses, Biztentra Publishers, New Delhi, 2005.
4. R.P Mohanty and S.G Desmukh. Essentials of supply chain management, Jaico Publishers, New Delhi, 2004.
5. R.P Mohanty and S.G Desmukh. Hand book on supply chain Management, Excel books, New Delhi, 2004.
6. P. Schönsleben, Integral logistics management: Operations and supply chain management in comprehensive value-added networks. CRC Press, New York, 2007
7. M. H. Hugos, Essentials of supply chain management, John Wiley & Sons., New jersey, 2011.
8. P. Jonsson, Logistics and supply chain management. McGraw-Hill Higher Education, New Delhi, 2008.

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Course Code: MSE 611

L - 4 P - 2 U - 6

Course Title: SUSTAINABLE MANUFACTURING

Prerequisite: NIL

Course content:

Unit I:

Sustainable Development: Definitions of sustainability, sustainable development, Challenges of environment and development, International response to challenges, sustainable development strategies, current practices, steps in improving strategies for sustainability development.

Unit II:

Sustainable Environment: Introduction to environmental legislation and energy costs - acceptable practice in society - adoption of low carbon technologies - need to reduce the carbon footprint of manufacturing operations. Techniques for non-market valuation: cost and income based approaches, demand estimation methods - expressed and revealed preference, choice modeling - Multi-criteria analysis- Stakeholder analysis - Environmental accounting at sector and national levels.

Unit III:

Planning for Sustainability: Concepts of Competitive Strategy and Manufacturing Strategies and development of a strategic improvement program - Manufacturing strategy in business success Strategy formation and formulation - Structured strategy formulation - Sustainable manufacturing system design options - Approaches to strategy formulation - Realization of new strategies/system designs

Unit IV:

Sustainable Operations: Principles of sustainable operations - Life cycle assessment Manufacturing and service activities - Influence of product design on operations - Process analysis - Capacity management – Quality management -Inventory management - Just-In-Time systems - Resource efficient design - Consumerism and sustainable well-being - Sustainable manufacturing and practices.

Unit V:

Evaluating Sustainability : Sustainability performance evaluators- Frameworks and techniques - environmental management systems - life cycle assessment - strategic and environmental impact assessments - carbon and water foot-printing.

Textbook(s)

1. G. Seliger, Sustainable Manufacturing: Shaping Global Value Creation, Springer, New York, 2012.

Reference book(s)

1. D. Clayton and S. Bass, Sustainable Development Strategies - A Resource Book, Earthscan Publishers, London, 2002
2. G. Seliger, Sustainability in Manufacturing: Recovery of Resources in Product and Material Cycles, Springer, New York, 2007.
3. M. Kutz, Environmentally Conscious Mechanical Design, John Wiley & Sons, New Jersey, 2007.
4. J.P. Davim, Sustainable Manufacturing, John Wiley & Sons, USA, 1st Edition, 2010.

Course Code: MSE 613

L - 4 P - 2 U - 6

Course Title: Technology Management

Prerequisite: NIL

Course content:

Unit I

Introduction: Technology and Society, Definition of Technology, classification of Technology, Definition of Management, Management of Technology, Conceptual framework for Management of Technology. The Role of Technology in the Creation of Wealth: Historical Perspective, the creation of wealth, The long wave cycle, The evolution of production Technology, The evolution of product Technology, Technology and National Income. Critical Factors in Managing Technology, The creativity factor: Invention and Innovation, Relation between Science and Technology, Types of Innovation, Creativity and Innovation, Bringing Innovation to the market, Technology-Price relationship, The timing factor, The vision to change the strategy, Managing Change, Productivity Effectiveness and Competitiveness, Leader Vs Followers.

Unit II

Management of Technology: The New Paradigms, Essential issues in manage technology, Resources, Business environment, the structure and Management of organization, Project Planning and Management, Management of Human Resources. Technology Life Cycles: The S-curve for of Technological process, Multiple generation technologies, Technology and market interaction, The product life cycle, Competition at a different phases of technology, Life cycle, Diffusion Technology, Diffusion communication channel relationship. The Process of Technological Innovation: Introduction, the Innovation wealth creation process, three critical trajectories impacting the innovation process

UNIT III

Competitiveness: Definition and indicators of Competitiveness, Management of technology and global Competitiveness, AA comparison of internal Competitiveness. Business Strategy and Technology Strategy, Definition of Strategy, Formulation of Strategy, Methods used in Strategic analysis and decision, Formulation of Technology Strategy, Direction of Strategy, Core Competences, Technology and the concept of Core Competences, Integration, Linking Technology and Business strategies, Creating the product technology business. Technology Planning Forecasting technology, Critical Technologies and Technology Maps, Technology Audit, Technology Audit Model, Planning according to Technology Life cycle, The B-tech approach to planning

UNIT IV

The Acquisition and Exploitation of Technology: Acquisition of Technology, Exploitation of Technology, Technology creation through R&D, Stages of technology development, Justification R&D Expenditures, The Government and military role in R&D, Global Management of R&D. Technology Transfer, Definitions and classifications, Channels of Technology flow, International Technology transfer, Technology transfer in Taiwan, US national

international Technology transfer, intrafirm technology transfer, The Manufacturing and Service Industries, World class manufacturing, Manufacturing system, Foundations of Manufacturing, The service industry, Wal-mart: A focus on People And technology.

UNIT V

The Design of Organizations: The Vertical Organizations, The Matrix Organizations, Project based Organizations, Organizations of the future, Organizing for the Technology Planning, Organizing for the R&D and new Ventures. The Changing Game of Management: Reengineering, the Revolution at General Electric, The FPL story, Managing with Technology

Textbooks:

T. Khalil, Management of Technology- The Key to Competitiveness and Wealth Creation, McGraw Hill, Boston, 2000.

Reference books:

1. N. Harrison & D. Samson, Technology Management, McGraw-Hill International, New York, 2002
2. Melissa A. Schilling, Strategic Management of Technological Innovation, TMH, New Delhi, 2008.
3. Goel Cohen, Technology Transfer: Strategic Management in Developing, Sage Publication, New Delhi, 2004.


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Course Code: MSE 614

L - 4 P - 2 U - 6

Course Title: Venture Management

Prerequisite: NIL

Course content:

Unit I

The Entrepreneurial perspective: Entrepreneurship and Entrepreneurial mind set, Entrepreneurial intentions and Corporate Entrepreneurship.

Unit II

From Idea to the opportunity: Creativity and generating business idea, Identifying and analyzing the domestic and International opportunities, Protecting the idea and other legal issues for the Entrepreneur.

Unit III

From opportunity to the business plan: The business plan: creating and starting the Venture, marketing plan, Financial Plan. Organizational Plan.

Unit IV

From business plan to funding the venture: Sources of capital, Informal Risk capital, venture capital and going public, SME policies, Implementation Status of the Package for Promotion of Micro and Small Enterprises.

Unit V

From funding the venture to the launching, growing and ending the new venture: Strategies for the growth and managing the implications of the growth, Assessing the resources for the growth from external sources, Succession planning and strategies for harvesting and ending of the venture.

Textbook(s)

1. Robert Hisrich, Michael Peters, Entrepreneurship, Tata McGraw Hill, 8th Edition, New Delhi, 2013.

Reference book(s)

1. K. Ramachandran, Entrepreneurship Development, Tata McGraw Hill, New Delhi, 1st Edition, 2008.
2. B. R. Barringer and R. D. Ireland, Entrepreneurship: Successfully Launching New Ventures, Pearson Prentice Hall, 4th Edition, New Jersey, 2011.



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Course No: CE421	Course Title: Water supply and Waste water Engineering	L	P	U
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Course Learning Objectives

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

Course Content

UNIT I

Population forecast and water demand; water treatment objectives; types of demand and their rate of consumption, sources of water, channels and pipes for conveying water; unit operations and processes in surface water treatment; principles, functions and design of flash mixers, flocculators, sedimentation tanks and sand filters; aeration; iron and manganese removal, defluoridation and demineralization; water softening disinfection, water treatment; typical layouts and water distribution.

UNIT II

Characteristics of sewage: Physical, chemical and biological characteristics: biological oxygen demand, chemical oxygen demand, cycles of decomposition, preliminary treatment: racks and screen, comminutors or shredders, grit chambers, disposal of grit, detritus tanks, skimming tanks, vacuum floatation method, primary treatment: principles, types of settling, settling of discrete particles, types of settling tanks, horizontal flow settling tanks, functions and design of primary sedimentation tanks.

UNIT III

Introduction, biological treatment techniques, types of sewage filters: intermittent sand filters, contact beds, activated sludge process and trickling filter; high rate filtration, process, design and efficiency of trickling filters, aeration units, mechanical aeration systems, aeration tank, advantages and disadvantages; other treatment methods: oxidation ditch, stabilisation ponds, aerobic ponds, anaerobic ponds, imhoff tanks and septic tanks design and construction features; advantages and disadvantages of septic tanks and imhoff tanks, advances in sewage treatment, waste water reuse and recycling.

UNIT IV

Introduction, sewage collection from houses and buildings, sludge treatment processes, amount and characteristics of sludge, sludge thickening or concentration; aerobic and anaerobic digestion of sludge; biogas recovery; drying beds; conditioning and dewatering; sludge disposal, sewage treatment; typical layouts.



UNIT V

Disposal by dilution; self-purification of surface water bodies; oxygen sag curve; disposal to lakes and sea, land disposal; sewage farming; deep well injection; soil dispersion system.

Text Books

1. Metcalf and Eddy, (2005). *Water and Waste water Engineering*. New York, USA: Tata McGraw Hill.
2. Peavy, H.S., Row, D.R. and Tchobanoglous, G. (1985). *Environmental Engineering*. New York, USA: McGraw Hill Book Company.

Reference Books

1. Manual on Water supply and Treatment – CPHEEO (2000).
2. Duggal, .K.N, (2002). *Elements of Environmental Engineering*. New Delhi: S. Chand & Company.
3. Punmia, B.C. and Jain, A.K. (1998). *Wastewater engineering (environmental Engineering-II): Including air pollution*. India: Laxmi Publications.

Course Outcomes

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 employability of the students.



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