

OBJECTIVES:

- To study the nature and facts about environment.
- To find and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds; Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over- utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river/forest/grassland/hill/mountain.

UNITIV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNITV HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

OUTCOMES:

- Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
- Public awareness of environmental is at infant stage.
- Ignorance and incomplete knowledge has led to misconceptions
- Development and improvement in std. of living has led to serious environmental disasters

TEXTBOOKS:

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.

REFERENCES :

1. Dharmendra S. Sengar, 'Environmental law', Prentice Hall of India Pvt Ltd, New Delhi, 2007.
2. Erach Bharucha, "Textbook of Environmental Studies", Universities Press (I) Pvt, Ltd, Hyderabad, 2015.
3. G. Tyler Miller and Scott E. Spoolman, "Environmental Science", Cengage Learning India PVT, LTD, Delhi, 2014.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.

EN8491 WATER SUPPLY ENGINEERING

**L T P C
3 0 0 3**

OBJECTIVE:

- To equip the students with the principles and design of water treatment units and distribution system.

UNITI SOURCES OF WATER 9

Public water supply system – Planning, Objectives, Design period, Population forecasting; Water demand – Sources of water and their characteristics, Surface and Groundwater – Impounding Reservoir – Development and selection of source – Source Water quality – Characterization – Significance – Drinking Water quality standards.

UNITII CONVEYANCE FROM THE SOURCE 9

Water supply – intake structures – Functions; Pipes and conduits for water – Pipe materials – Hydraulics of flow in pipes – Transmission main design – Laying, jointing and testing of pipes – appurtenances – Types and capacity of pumps – Selection of pumps and pipe materials.

UNIT III WATERTREATMENT

9

Objectives – Unit operations and processes – Principles, functions, and design of water treatment plant units, aerators of flash mixers, Coagulation and flocculation – Clariflocculator-Plate and tube settlers – Pulsator clarifier – sand filters – Disinfection – Residue Management – Construction, Operation and Maintenance aspects.

UNIT IV ADVANCED WATERTREATMENT

9

Water softening – Desalination- R.O. Plant – demineralization – Adsorption – Ion exchange– Membrane Systems – RO Reject Management – Iron and Manganese removal – Defluoridation – Construction and Operation & Maintenance aspects – Recent advances – MBR process

UNIT V WATER DISTRIBUTION AND SUPPLY

9

Requirements of water distribution – Components – Selection of pipe material – Service reservoirs – Functions – Network design – Economics – Analysis of distribution networks – Computer applications – Appurtenances – Leak detection. Principles of design of water supply in buildings – House service connection – Fixtures and fittings, systems of plumbing and types of plumbing.

TOTAL: 45 PERIODS

OUTCOMES:

The students completing the course will have

- an insight into the structure of drinking water supply systems, including water transport, treatment and distribution
- the knowledge in various unit operations and processes in water treatment
- an ability to design the various functional units in water treatment
- an understanding of water quality criteria and standards, and their relation to public health
- the ability to design and evaluate water supply project alternatives on basis of chosen criteria.

TEXTBOOKS:

1. Garg, S.K. Environmental Engineering, Vol.I Khanna Publishers, New Delhi, 2010.
2. Modi, P.N., Water Supply Engineering, Vol.I Standard Book House, New Delhi, 2010.
3. Punmia, B.C., Ashok Jain and Arun Jain, Water Supply Engineering, Laxmi Publications (P) Ltd., New Delhi, 2014.

REFERENCES:

1. Manual on Water Supply and Treatment, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1999.
2. Syed R. Qasim and Edward M. Motley Guang Zhu, Water Works Engineering Planning, Design and Operation, Prentice Hall of India Learning Private Limited, New Delhi, 2009.

EN8592

WASTEWATER ENGINEERING

L T P C

3 0 0 3

OBJECTIVE:

- The objectives of this course is to help students develop the ability to apply basic understanding of physical, chemical, and biological phenomena for successful design, operation and maintenance of sewage treatment plants.

UNIT I PLANNING AND DESIGN OF SEWERAGE SYSTEM

9

Characteristics and composition of sewage – population equivalent – Sanitary sewage flow estimation – Sewer materials – Hydraulics of flow in sanitary sewers – Sewer design – Storm drainage – Storm runoff estimation – sewer appurtenances – corrosion in sewers – prevention and control – sewage pumping – drainage in buildings – plumbing systems for drainage – Rain Water ting.

UNITII PRIMARY TREATMENT OF SEWAGE

9

Objectives – Unit Operations and Processes – Selection of treatment processes – Onsite sanitation - Septic tank- Grey water harvesting – Primary treatment – Principles, functions and design of sewage treatment units - screens - grit chamber-primary sedimentation tanks – Construction, Operation and Maintenance aspects.

UNITIII SECONDARY TREATMENT OF SEWAGE

9

Objectives – Selection of Treatment Methods – Principles, Functions, - Activated Sludge Process and Extended aeration systems -Trickling filters– Sequencing Batch Reactor(SBR) – Membrane Bioreactor - UASB – Waste Stabilization Ponds – - Other treatment methods -Reclamation and Reuse of sewage - Recent Advances in Sewage Treatment – Construction, Operation and Maintenance aspects.

UNITIV DISPOSAL OF SEWAGE

9

Standards for– Disposal - Methods – dilution – Mass balance principle - Self purification of river- Oxygen sag curve – deoxygenation and reaeration - Streeter–Phelps model - Land disposal – Sewage farming – sodium hazards - Soil dispersion system.

UNITV SLUDGE TREATMENT AND DISPOSAL

9

Objectives - Sludge characterization – Thickening - Design of gravity thickener- Sludge digestion – Standard rate and High rate digester design- Biogas recovery – Sludge Conditioning and Dewatering – Sludge drying beds- ultimate residue disposal – recent advances.

TOTAL: 45 PERIODS

OUTCOMES:

The students completing the course will have

- An ability to estimate sewage generation and design sewer system including sewage pumping stations
- The required understanding on the characteristics and composition of sewage, self-purification of streams
- An ability to perform basic design of the unit operations and processes that are used in sewage treatment
- Understand the standard methods for disposal of sewage.
- Gain knowledge on sludge treatment and disposal.

TEXTBOOKS:

1. Garg, S.K., Environmental Engineering Vol. II, Khanna Publishers, New Delhi, 2015.
2. Duggal K.N., "Elements of Environmental Engineering" S.Chand and Co. Ltd., New Delhi, 2014.
3. Punmia, B.C., Jain, A.K., and Jain.A.K., Environmental Engineering, Vol.II, Laxmi Publications, 2010.

REFERENCES:

1. Manual on Sewerage and Sewage Treatment Systems Part A,B and C, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 2013.
2. Metcalf and Eddy- Wastewater Engineering–Treatment and Reuse, Tata Mc.Graw-Hill Company, New Delhi, 2010.
3. Syed R. Qasim "Wastewater Treatment Plants", CRC Press, Washington D.C., 2010
4. Gray N.F, "Water Technology", Elsevier India Pvt. Ltd., New Delhi, 2006.

OBJECTIVE:

- At the end of the semester, the student shall conceive, design and draw the irrigation and environmental engineering structures in detail showing the plan, elevation and Sections.

PART A: IRRIGATION ENGINEERING**1. TANK COMPONENTS**

Fundamentals of design - Tank surplus weir - Tank sluice with tower head - Drawings showing foundation details, plan and elevation

9

2. IMPOUNDING STRUCTURES

Design principles - Earth dam - Profile of Gravity Dam

6

3. CROSS DRAINAGE WORKS

General design principles - Aqueducts - Syphon aqueduct (Type III) - Canal drop (Notch Type) - Drawing showing plan, elevation and foundation details.

6

4. CANAL REGULATION STRUCTURES

General Principles - Direct Sluice - Canal regulator - Drawing showing detailed plan, elevation and foundation details.

9

PART B: ENVIRONMENTAL ENGINEERING**1. WATER SUPPLY AND TREATMENT**

Design and Drawing of flash mixer, flocculator, clarifier - Rapid sand filter - Service reservoirs - Pumping station - House service connection for water supply and drainage.

15

4. SEWAGE TREATMENT & DISPOSAL

Design and Drawing of screen chamber - Grit channel - Primary clarifier - Activated sludge process - Aeration tank - Trickling filter - Sludge digester - Sludge drying beds - Septic tanks and disposal arrangements.

15

TOTAL: 60 PERIODS**OUTCOME:**

- The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.

TEXTBOOKS:

- Satya Narayana Murthy Challa, "Water Resources Engineering: Principles and Practice", New Age International Publishers, New Delhi, 2002.
- Garg, S.K., "Irrigation Engineering and Design of Structures", New Age International Publishers, New Delhi, 1997.
- Manual on Water Supply and Treatment, CPHEEO, Government of India, New Delhi, 1999.
- Manual on "Sewerage and Sewage Treatment Systems- Part A, B and C" CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 2013.

REFERENCES:

- Mohanakrishnan. A, "A few Novel and Interesting Innovative Irrigation Structures: Conceived, Designed and Executed in the Plan Projects in Tamil Nadu", Publ. No. 44 and Water Resources Development & Management Publ.No.43, IMTI Thuvakudy, Trichy, 2011.
- Raghunath, H.M. "Irrigation Engineering", Wiley India Pvt. Ltd., New Delhi, 2011.
- Sharma R.K., "Irrigation Engineering and Hydraulic Structures", Oxford and IBH Publishing

- Co., New Delhi, 2002.
4. Peary, H.S., ROWE, D.R., Tchobanoglous, G., "Environmental Engineering", McGraw-Hill Book Co., New Delhi, 1995.
 5. Metcalf and Eddy, "Wastewater Engineering, Treatment and Reuse", Tata McGraw-Hill, New Delhi, 2010.
 6. Qasim, S.R., Motley, E.M and Zhu, G. "Water works Engineering – Planning, Design and Operation", Prentice Hall, New Delhi, 2009.
 7. Qasim, S. R. "Wastewater Treatment Plants, Planning, Design & Operation", CRC Press, New York, 2010.

HS8581

PROFESSIONAL COMMUNICATION

L	T	P	C
0	0	2	1

OBJECTIVES: The course aims to:

- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully.

UNIT I

Introduction to Soft Skills-- Hard skills & soft skills - employability and career Skills—Grooming as a professional with values—Time Management—General awareness of Current Affairs

UNIT II

Self-Introduction-organizing the material - Introducing oneself to the audience – introducing the topic – answering questions – individual presentation practice— presenting the visuals effectively – 5 minute presentations

UNIT III

Introduction to Group Discussion— Participating in group discussions – understanding group dynamics - brainstorming the topic — questioning and clarifying –GD strategies- activities to improve GD skills

UNIT IV

Interview etiquette – dress code – body language – attending job interviews– telephone/skype interview -one to one interview & panel interview – FAQs related to job interviews

UNIT V

Recognizing differences between groups and teams- managing time-managing stress- networking professionally- respecting social protocols-understanding career management-developing a long-term career plan-making career changes

TOTAL :30 PERIODS

OUTCOMES: At the end of the course Learners will be able to:

- Make effective presentations
- Participate confidently in Group Discussions.
- Attend job interviews and be successful in them.
- Develop adequate Soft Skills required for the workplace

Recommended Software

1. Globe arena
2. Win English

REFERENCES:

1. Butterfield, Jeff Soft Skills for Everyone. Cengage Learning: New Delhi, 2015
2. Interact English Lab Manual for Undergraduate Students, Orient Black Swan: Hyderabad, 2016.
3. E. Suresh Kumar et al. Communication for Professional Success. Orient Black Swan: Hyderabad, 2015
4. Raman, Meenakshi and Sangeeta Sharma. Professional Communication. Oxford University Press: Oxford, 2014
5. S. Hariharan et al. Soft Skills. MJP Publishers: Chennai, 2010.

GI8014

GEOGRAPHIC INFORMATION SYSTEM

L TPC
3 0 03

OBJECTIVES :

- To introduce the fundamentals and components of Geographic Information System
- To provide details of spatial data structures and input, management and output processes.

UNIT I FUNDAMENTALS OF GIS

9

Introduction to GIS - Basic spatial concepts - Coordinate Systems - GIS and Information Systems - Definitions - History of GIS - Components of a GIS - Hardware, Software, Data, People, Methods - Proprietary and open source Software - Types of data - Spatial, Attribute data - types of attributes - scales/ levels of measurements.

UNIT II SPATIAL DATA MODELS

9

Database Structures - Relational, Object Oriented - Entities - ER diagram - data models - conceptual, logical and physical models - spatial data models - Raster Data Structures - Raster Data Compression - Vector Data Structures - Raster vs Vector Models - TIN and GRID data models.

UNIT III DATA INPUT AND TOPOLOGY

9

Scanner - Raster Data Input - Raster Data File Formats - Georeferencing - Vector Data Input - Digitiser - Datum Projection and reprojection - Coordinate Transformation - Topology - Adjacency, connectivity and containment - Topological Consistency - Non topological file formats - Attribute Data linking - Linking External Databases - GPS Data Integration

UNIT IV DATA QUALITY AND STANDARDS

9

Data quality - Basic aspects - completeness, logical consistency, positional accuracy, temporal accuracy, thematic accuracy and lineage - Metadata - GIS Standards - Interoperability - OGC - Spatial Data Infrastructure

UNIT V DATA MANAGEMENT AND OUTPUT

9

Import/Export - Data Management functions - Raster to Vector and Vector to Raster Conversion - Data Output - Map Compilation - Chart/Graphs - Multimedia - Enterprise Vs. Desktop GIS - distributed GIS.

TOTAL: 45 PERIODS

OUTCOMES:

This course equips the student to

- Have basic idea about the fundamentals of GIS.
- Understand the types of data models.
- Get knowledge about data input and topology.
- Gain knowledge on data quality and standards.
- Understand data management functions and data output

TEXT BOOKS:

1. Kang - TsungChang, Introduction to Geographic Information Systems, McGraw Hill Publishing, 2nd Edition, 2011.
2. Ian Heywood, Sarah Cornelius, Steve Carver, SrinivasaRaju, "An Introduction Geographical Information Systems, Pearson Education, 2nd Edition, 2007.

REFERENCE:

1. Lo.C.P., Albert K.W. Yeung, Concepts and Techniques of Geographic Information Systems, Prentice-Hall India Publishers, 2006

GE8071

DISASTERMANAGEMENT

L T PC 3
0 03**OBJECTIVES:**

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS

9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR)

9

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority (SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT

9

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA

9

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNITV DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS

OUTCOMES:

The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

TEXTBOOKS:

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13:978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13:978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IAS and Sage Publishers, New Delhi, 2010.

REFERENCES:

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy, 2009.

GE8074

HUMANRIGHTS

**L T PC
3 0 03**

OBJECTIVE:

- To sensitize the Engineering students to various aspects of Human Rights.

UNITI

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights. Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights.

UNITII

Evolution of the concept of Human Rights Magna carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights.

UNITIII

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNITIV

Human Rights in India – Constitutional Provisions / Guarantees.

UNITV

Human Rights of Disadvantaged People – Women, Children, Displaced persons and Disabled persons, including Aged and HIV Infected People. Implementation of Human Rights – National and State Human Rights Commission – Judiciary – Role of NGO's, Media, Educational Institutions, Social Movements.

TOTAL : 45 PERIODS**OUTCOME :**

- Engineering students will acquire the basic knowledge of human rights.

REFERENCES:

1. Kapoor S.K., "Human Rights under International law and Indian Laws", Central Law Agency, Allahabad, 2014.
2. Chandra U., "Human Rights", Allahabad Law Agency, Allahabad, 2014.
3. Upendra Baxi, The Future of Human Rights, Oxford University Press, New Delhi

GE8075**INTELLECTUAL PROPERTY RIGHTS****LT PC
3 0 03****OBJECTIVE:**

- To give an idea about IPR, registration and its enforcement.

UNITI**INTRODUCTION****9**

Introduction to IPRs, Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO – TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

UNITII**REGISTRATION OF IPRs****10**

Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad

UNITIII**AGREEMENTS AND LEGISLATIONS****10**

International Treaties and Conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.

UNITIV**DIGITAL PRODUCTS AND LAW****9**

Digital Innovations and Developments as Knowledge Assets – IP Laws, Cyber Law and Digital Content Protection – Unfair Competition – Meaning and Relationship between Unfair Competition and IP Laws – Case Studies.

UNITV**ENFORCEMENT OF IPRs****7**

Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies.

TOTAL: 45 PERIODS**OUTCOME:**

- Ability to manage Intellectual Property portfolio to enhance the value of the firm.

TEXTBOOKS:

1. V. Scople Vinod, Managing Intellectual Property, Prentice Hall of India Pvt Ltd, 2012
2. S. V. Satakar, "Intellectual Property Rights and Copy Rights, EssEss Publications, New Delhi, 2002

REFERENCES:

1. Deborah E. Bouchoux, "Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets", Cengage Learning, Third Edition, 2012.
2. Prabuddha Ganguli, "Intellectual Property Rights: Unleashing the Knowledge Economy", McGraw Hill Education, 2011.
3. Edited by Derek Bosworth and Elizabeth Webster, The Management of Intellectual Property, Edward Elgar Publishing Ltd., 2013.

CE8008

TRANSPORT AND ENVIRONMENT

L T P C
3 0 0 3

OBJECTIVE:

- The objective of this course is to create an awareness / overview of the impact of Transportation Projects on the environment and society..

UNIT I INTRODUCTION

8

Environmental Inventory, Environmental Assessment, Environmental Impact Assessment (EIA), Environmental Impact of Transportation Projects, Need for EIA, EIA Guidelines for Transportation Project, Historical Development.

UNIT II METHODOLOGIES

8

Elements of EIA – Screening and Scoping – Methods of Impact Analysis – Applications – Appropriate methodology.

UNIT III ENVIRONMENTAL IMPACT, PREDICTION AND ASSESSMENT

10

Prediction and Assessment of Impact of Transportation Project at various stages on water, air, noise, land acquisition and resettlement, Socio economic impact, indigenous people, aesthetics, health and safety, energy studies, IRC guidelines.

UNIT IV ENVIRONMENTAL MITIGATION AND MANAGEMENT PLAN

10

Mitigation of the impact on Natural and Man-made Environment, Health, Water, Land, Noise, Air, Public participation, Environmental Management Plan, Energy Conservation, Methods to reduce Global Warming.

UNIT V EIA CASE STUDIES

9

EIA Case Studies on Highway, Railway, Airways and Waterways Projects

TOTAL: 45 PERIODS

OUTCOMES:

Students will be able to

- Understood the impact of Transportation projects on the environment.
- Get knowledge on methods of impact analysis and their applications.
- Understand environmental Laws on Transportation Projects and the mitigative measures adopted in the planning stage.
- Predict and assess the impact of transportation projects.

TEXTBOOKS:

1. Canter, L.R., Environmental Impact Assessment, McGraw Hill, New Delhi, 1996.
2. Indian Road Congress (IRC), Environmental Impact of Highway Projects, IRC, Delhi, 1998.
3. P. Meenakshi, Elements of Environmental Science and Engineering, Prentice Hall of India, New Delhi, 2006
4. Thirumurthy A.M., Introduction to Environmental Science and Management, Shroff Publishers, Bombay, 2005

REFERENCES:

1. John G. Rau and David, C. Hooten, Environmental Impact Analysis Handbook, McGraw Hill Book Company, 1995
2. James H. Banks, Introduction to Transportation Engineering, McGraw Hill Book Company, 2000
3. World Bank, A Handbook on Roads and Environment, Vol. I and II, Washington DC, 1997
4. Priya Ranjan Trivedi, International Encyclopedia of Ecology and Environment – EIA, Indian Institute of Ecology and Environment, New Delhi, 1998

CE8010

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

L T P C
3 0 0 3

OBJECTIVE:

- To impart the knowledge and skills to identify, assess and mitigate the environmental and social impacts of developmental projects

UNIT I INTRODUCTION

9

Impacts of Development on Environment – Rio Principles of Sustainable Development- Environmental Impact Assessment (EIA) – Objectives – Historical development – EIA Types – EIA in project cycle – EIA Notification and Legal Framework – Stakeholders and their Role in EIA – Selection & Registration Criteria for EIA Consultants

UNIT II ENVIRONMENTAL ASSESSMENT

9

Screening and Scoping in EIA – Drafting of Terms of Reference, Baseline monitoring, Prediction and Assessment of Impact on land, water, air, noise and energy, flora and fauna – Matrices – Networks – Checklist Methods – Mathematical models for Impact prediction – Analysis of alternatives

UNIT III ENVIRONMENTAL MANAGEMENT PLAN

9

Plan for mitigation of adverse impact on water, air and land, water, energy, flora and fauna – Environmental Monitoring Plan – EIA Report Preparation – Review of EIA Reports – Public Hearing-Environmental Clearance Post Project Monitoring

UNIT IV SOCIOECONOMIC ASSESSMENT

9

Baseline monitoring of Socio economic environment – Identification of Project Affected Personal – Rehabilitation and Resettlement Plan- Economic valuation of Environmental impacts – Cost benefit Analysis-

UNIT V CASE STUDIES

9

EIA case studies pertaining to Infrastructure Projects – Real Estate Development - Roads and Bridges – Mass Rapid Transport Systems - Ports and Harbor – Airports - Dams and Irrigation projects - Power plants – CETPs- Waste Processing and Disposal facilities – Mining Projects.

TOTAL: 45 PERIODS

OUTCOMES:

The students completing the course will have ability to

- carry out scoping and screening of developmental projects for environmental and social assessments
- explain different methodologies for environmental impact prediction and assessment
- plan environmental impact assessments and environmental management plans
- evaluate environmental impact assessment reports

TEXTBOOKS:

1. Canter, R.L, "Environmental impact Assessment ", 2nd Edition, McGraw Hill Inc, New Delhi, 1995.
2. Lohani, B., J.W. Evans, H. Ludwig, R.R. Everitt, Richard A. Carpenter, and S.L. Tu, "Environmental Impact Assessment for Developing Countries in Asia", Volume 1 – Overview, Asian Development Bank, 1997.
3. Peter Morris, Riki Therivel "Methods of Environmental Impact Assessment", Routledge Publishers, 2009.

REFERENCES:

1. Becker H. A., Frank Vanclay, "The International handbook of social impact assessment" conceptual and methodological advances, Edward Elgar Publishing, 2003.
2. Barry Sadler and Mary McCabe, "Environmental Impact Assessment Training Resource Manual", United Nations Environment Programme, 2002.
3. Judith Petts, "Handbook of Environmental Impact Assessment Vol. I and II", Blackwell Science New York, 1998.
4. Ministry of Environment and Forests EIA Notification and Sectoral Guides, Government of India, New Delhi, 2010.

EN8591**MUNICIPAL SOLID WASTE MANAGEMENT****L T P C
3 0 0 3****OBJECTIVE:**

- To make the students conversant with the types, sources, generation, storage, collection, transport, processing and disposal of municipal solid waste.

UNIT I SOURCES AND CHARACTERISTICS 9

Sources and types of municipal solid wastes- Public health and environmental impacts of improper disposal of solid wastes- sampling and characterization of wastes - factors affecting waste generation rate and characteristics - Elements of integrated solid waste management - Requirements and salient features of Solid waste management rules (2016) — Role of public and NGO's- Public Private participation – Elements of Municipal Solid Waste Management Plan.

UNIT II SOURCE REDUCTION , WASTE STORAGE AND RECYCLING 8

Waste Management Hierarchy - Reduction, Reuse and Recycling - source reduction of waste – On-site storage methods – Effect of storage, materials used for containers – segregation of solid wastes – Public health and economic aspects of open storage – case studies under Indian conditions – Recycling of Plastics and Construction/Demolition wastes.

UNIT III COLLECTION AND TRANSFER OF WASTES 8

Methods of Residential and commercial waste collection – Collection vehicles – Manpower – Collection routes – Analysis of waste collection systems; Transfer stations – location, operation and maintenance; options under Indian conditions – Field problems- solving.

UNIT IV PROCESSING OF WASTES 12

Objectives of waste processing – Physical Processing techniques and Equipment; Resource recovery from solid waste composting and biomethanation; Thermal processing options – case studies under Indian conditions.

UNIT V WASTE DISPOSAL 8

Land disposal of solid waste- Sanitary landfills – site selection, design and operation of sanitary landfills – Landfill liners – Management of leachate and landfill gas- Landfill bioreactor – Dumpsite Rehabilitation

TOTAL: 45 PERIODS

OUTCOMES:

The students completing the course will demonstrate

- understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.
- Reduction, reuse and recycling of waste.
- ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.
- knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.
- Design and operation of sanitary landfill.

TEXTBOOKS:

1. William A. Worrell, P. Aarne Vesilind (2012) Solid Waste Engineering, Cengage Learning, 2012.
2. John Pitchel (2014), Waste Management Practices-Municipal, Hazardous and industrial – CRC Press, Taylor and Francis, New York.

REFERENCES:

1. CPHEEO (2014), "Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organisation, Government of India, New Delhi.
2. George Tchobanoglous and Frank Kreith (2002). Handbook of Solid waste management, McGraw Hill, New York.

GE8077

TOTAL QUALITY MANAGEMENT

LT PC
3 0 03

OBJECTIVE:

- To facilitate the understanding of Quality Management principles and process.

UNIT I INTRODUCTION

9

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention.

UNIT II TQM PRINCIPLES

9

Leadership - Quality Statements, Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS AND TECHNIQUES I

9

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV TQM TOOLS AND TECHNIQUES II

9

Quality Circles - Cost of Quality - Quality Function Deployment (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

UNIT V QUALITY MANAGEMENT SYSTEM

9

Introduction—Benefits of ISO Registration—ISO 9000 Series of Standards—Sector-Specific Standards—AS 9100, TS16949 and TL 9000-- ISO 9001 Requirements—Implementation—Documentation—Internal Audits—Registration—ENVIRONMENTAL MANAGEMENT SYSTEM:

TOTAL: 45 PERIODS

CE8015

INTEGRATED WATER RESOURCES MANAGEMENT

**L T PC
3 0 03**

OBJECTIVES:

- To introduce the students to the interdisciplinary analysis of water and conceptual design of intervention strategies.
- To develop a knowledge-base on capacity building on IWRM.

UNIT I IWRM FRAMEWORK

9

Definition – Objectives – Principles – Evolution of IWRM – IWRM relevance in water resources management – Paradigm shift : Processes and prospective outcomes

UNIT II CONTEXTUALIZING IWRM

9

UN formulations - SDG goals - IWRM in Global, Regional and Local water partnership – Institutional transformation - Bureaucratic reforms - Inclusive development

UNIT III EMERGING ISSUES IN WATER MANAGEMENT

9

Emerging Issues — Drinking water management in the context of climate change - IWRM and irrigation - Flood – Drought – Pollution – Linkages between water, health and poverty

UNIT IV IWRM AND WATER RESOURCES DEVELOPMENT IN INDIA

9

Rural Development - Ecological sustainability - Watershed development and conservation - Ecosystem regeneration – Wastewater reuse - Sustainable livelihood - Food security

UNIT V ASPECTS OF INTEGRATED DEVELOPMENT

9

Capacity building - Conceptual framework of IWRM – Problems and policy issues - Solutions for effective integrated water management - Case studies

TOTAL: 45 PERIODS

OUTCOMES:

The students will be able to

- Understand objectives, principles and evolution of integrated water resources management.
- Have an idea of contextualizing IWRM
- Gain knowledge in emerging issues in water management, flood, drought, pollution and poverty.
- Understand the water resources development in India and wastewater reuse.
- Gain knowledge on integrated development of water management.

TEXTBOOKS:

1. Mollinga P. *et al.* "Integrated Water Resources Management", Water in South Asia Volume I, Sage Publications, 2006.
2. Sithamparanathan, Rangasamy, A., and Arunachalam, N., "Ecosystem Principles and

REFERENCES:

1. Cech Thomas V., Principles of Water Resources: History, Development, Management and Policy. John Wiley and Sons Inc., New York.2003.
2. Murthy, J.V.S., "Watershed Management in India", Wiley Eastern Ltd., New York,1995.
3. Dalte, S.J.C., "Soil Conservation and Land Management", International Book Distribution, India, 1986.

CE8016

GROUNDWATERENGINEERING

L TP C

3 0 03

OBJECTIVES:

- To introduce the student to the principles of Groundwater governing Equations and Characteristics of different aquifers,
- To understand the techniques of development and management of groundwater.

UNIT I HYDROGEOLOGICAL PARAMETERS 9
Introduction–Waterbearing Properties of Rock–Type of aquifers–Aquifer properties– permeability, specific yield, transmissivity and storage coefficient–Methods of Estimation–GEC norms - Steady state flow - Darcy's Law - Groundwater Velocity — Dupuit Forchheimer assumption – Steady Radial Flow into a Well

UNIT II WELL HYDRAULICS 9
Unsteady state flow - Theis method - Jacob method – Chow's method – Law of Times – Theis Recovery – Bailer method – Slug method - tests - Image well theory – Partial penetrations of wells – Well losses – Specific Capacity and Safe yield - Collector well and Infiltration gallery

UNIT III GROUNDWATER MANAGEMENT 9
Need for Management Model – Database for Groundwater Management – Groundwater balance study – Introduction to Mathematical model – Model Conceptualization – Initial and Boundary Condition – Calibration – Validation – Future Prediction – Sensitivity Analysis – Uncertainty – Development of a model

UNIT IV GROUNDWATER QUALITY 9
Ground water chemistry - Origin, movement and quality - Water quality standards – Drinking water – Industrial water – Irrigation water - Ground water Pollution and legislation - Environmental Regulatory requirements

UNIT V GROUNDWATER CONSERVATION 9
Artificial recharge techniques – Reclaimed wastewater recharge – Soil aquifer treatment (SAT) – Aquifer Storage and Recovery (ASR) Seawater Intrusion and Remediation – Ground water Basin management and Conjunctive use – Protection zone delineation, Contamination source inventory and remediation schemes

TOTAL: 45 PERIODS

OUTCOMES:

The students will be able to

- Understand aquifer properties and its dynamics
- Get an exposure towards well design and practical problems
- Develop a model for groundwater management.
- Students will be able to understand the importance of artificial recharge and groundwater quality concepts
- Gain knowledge on conservation of groundwater.

TEXTBOOKS:

1. Raghunath H.M., "Ground Water Hydrology", New Age International (P) Limited, New Delhi, 2010.
2. Todd D.K., "Ground Water Hydrology", John Wiley and Sons, New York, 2000.

REFERENCES:

1. Fitts R Charles, "Groundwater Science". Elsevier, Academic Press, 2002.
2. Ramakrishnan, S, Ground Water, K.J. Graph arts, Chennai, 1998.

CE8018**GEO-ENVIRONMENTAL ENGINEERING****L TPC****3 0 03****OBJECTIVE:**

- The student acquires the knowledge on the Geotechnical engineering problems associated with soil contamination, safe disposal of waste and remediate the contaminated soils by different techniques thereby protecting environment.

UNIT I GENERATION OF WASTES AND CONSEQUENCES OF SOIL POLLUTION 8

Introduction to Geo environmental engineering – Environmental cycle – Sources, production and classification of waste – Causes of soil pollution – Factors governing soil pollution interaction clay minerals - Failures of foundation due to waste movement.

UNIT II SITE SELECTION AND SAFE DISPOSAL OF WASTE 10

Safe disposal of waste – Site selection for landfills – Characterization of land fill sites and waste – Risk assessment – Stability of landfills – Current practice of waste disposal – Monitoring facilities – Passive containment system – Application of geosynthetics in solid waste management – Rigid or flexible liners.

UNIT III TRANSPORT OF CONTAMINANTS 8

Contaminant transport in sub surface – Advection, Diffusion, Dispersion – Governing equations – Contaminant transformation – Sorption – Biodegradation – Ion exchange – Precipitation – Hydrological consideration in land fill design – Ground water pollution.

UNIT IV WASTE STABILIZATION 10

Stabilization - Solidification of wastes – Micro and macro encapsulation – Absorption, Adsorption, Precipitation – Detoxification – Mechanism of stabilization – Organic and inorganic stabilization – Utilization of solid waste for soil improvement – case studies.

UNIT V REMEDIATION OF CONTAMINATED SOILS 9

Exsitu and Insitu remediation-Solidification, bio-remediation, incineration, soil washing, phyto remediation, soil heating, vetrification, bio-venting.

TOTAL: 45 PERIODS**OUTCOMES:**

The students will be able to

- Assess the contamination in the soil
- Understand the current practice of waste disposal
- To prepare the suitable disposal system for particular waste.
- Stabilize the waste and utilization of solid waste for soil improvement.
- Select suitable remediation methods based on contamination.

TEXTBOOKS:

1. Hari D. Sharma and Krishna R. Reddy, "Geo-Environmental Engineering" – John Wiley and

- Sons, INC, USA, 2004.
2. Daniel B.E., "Geotechnical Practice for waste disposal", Chapman & Hall, London 1993.
 3. Manoj Datta, "Waste Disposal in Engineered landfills", Narosa Publishing House, 1997.
 4. Manoj Datta, B.P. Parida, B.K. Guha, "Industrial Solid Waste Management and Landfilling Practice", Narosa Publishing House, 1999.

REFERENCES:

1. Westlake, K, "Landfill Waste pollution and Control", Albion Publishing Ltd., England, 1995.
2. Wentz, C.A., "Hazardous Waste Management", McGraw Hill, Singapore, 198
3. Proceedings of the International symposium on "Environmental Geotechnology" (Vol. I and II). Environmental Publishing Company, 1986 and 1989.
4. Ott, W.R., "Environmental indices, Theory and Practice", Ann Arbor, 1978.
5. Fried, J.J., "Ground Water Pollution", Elsevier, 1975.
6. ASTM Special Tech. Publication 874, Hydraulic Barrier in Soil and Rock, 1985.
7. Lagrega, M.D., Buckingham, P.L. and Evans, J.C., "Hazardous Waste Management" McGraw Hill Inc. Singapore, 1994.

CE8091

HYDROLOGY AND WATER RESOURCES ENGINEERING

**L T P C
3 0 0 3**

OBJECTIVE:

- To introduce the student to the concept of hydrological aspects of water availability and requirements and should be able to quantify, control and regulate the water resources.

UNIT I PRECIPITATION AND ABSTRACTIONS 10

Hydrological cycle- Meteorological measurements – Requirements, types and forms of precipitation - Rain gauges-Spatial analysis of rainfall data using Thiessen and Isohyet methods-Interception - Evaporation. Horton's equation, pan evaporation measurements and evaporation suppression - Infiltration-Horton's equation - double ring infiltrometer, infiltration indices.

UNIT II RUNOFF 8

Watershed, catchment and basin - Catchment characteristics - factors affecting runoff - Run off estimation using empirical - Strange's table and SCS methods – Stage discharge relationships-flow measurements- Hydrograph – Unit Hydrograph – IUH

UNIT III FLOOD AND DROUGHT 9

Natural Disasters-Flood Estimation- Frequency analysis- Flood control- Definitions of droughts- Meteorological, hydrological and agricultural droughts- IMD method-NDVI analysis- Drought Prone Area Programme (DPAP)

UNIT IV RESERVOIRS 8

Classification of reservoirs, General principles of design, site selection, spillways, elevation – area - capacity - storage estimation, sedimentation - life of reservoirs – rule curve

UNIT V GROUNDWATER AND MANAGEMENT 10

Origin- Classification and types - properties of aquifers- governing equations – steady and unsteady flow - artificial recharge - RWH in rural and urban areas

TOTAL: 45 PERIODS

OUTCOMES:

The students completing the course will have

- an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments,
- ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial

- recharge
- ability to conduct Spatial analysis of rainfall data and design water storagereservoirs
- Understand the concept and methods of ground watermanagement.

TEXTBOOKS:

1. Subramanya .K. "Engineering Hydrology"- Tata McGraw Hill,2010
2. Jayarami Reddy .P. "Hydrology", Tata McGraw Hill,2008.
- Linsley, R.K. and Franzini, J.B. "Water Resources Engineering", McGraw Hill International Book Company,1995.

REFERENCES:

1. David Keith Todd. "Groundwater Hydrology", John Wiley & Sons, Inc.2007
2. VenTe Chow, Maidment, D.R. and Mays, L.W. "Applied Hydrology", McGraw Hill International Book Company,1998.
3. Raghunath .H.M., "Hydrology", Wiley Eastern Ltd.,1998.

GE8076

PROFESSIONAL ETHICSINENGINEERING

LT PC
3 0 03

OBJECTIVE:

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNITI HUMANVALUES

10

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNITII ENGINEERINGETHICS

9

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.

UNITIII ENGINEERING ASSOCIAL EXPERIMENTATION

9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNITIV SAFETY, RESPONSIBILITIESAND RIGHTS

9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – OccupationalCrime–ProfessionalRights–EmployeeRights–IntellectualPropertyRights(IPR) – Discrimination.

UNITV GLOBAL ISSUES

8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility.

TOTAL: 45 PERIODS

OUTCOME:

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

TEXT BOOKS:

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New

- Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" McGraw Hill education, India Pvt. Ltd., New Delhi, 2013.
6. World Community Service Centre, 'Value Education', Vethathiri publications, Erode, 2011.

Web sources:

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org


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AGNI COLLEGE OF TECHNOLOGY
Old Mahabalipuram Road,
Vandalur, Chennai - 600 090

OBJECTIVES:

The student should be able to:

Understand the principles, practices and areas of application in Hospital Management.

UNIT I OVERVIEW OF HOSPITAL ADMINISTRATION

Evolution of hospital administration, challenges in hospital administration, Hospital layout, Equipment Planning, Functional Planning, Patient issues in Hospital Management, Hospital Accreditation, Medical Waste Management.

UNIT II HUMAN RESOURCE MANAGEMENT IN HOSPITAL

Functions of HRM, Functions of HRM, Role of HRM Manager, Types of HRM, Hospital Inventory, Manager Planning, Different Departments of Hospital Management, Hospital Recruitment, Methods of Training, Evaluation of Training, Hospital Quality and Safety.

UNIT III MARKETING RESEARCH & CONSUMER BEHAVIOUR

Marketing information systems, Assessing information needs, Developing marketing strategy, Market Research process, Other market research considerations, Consumer behaviour, Buyer Behaviour, Model of consumer behaviour, Types of buying decision process, The buyer decision process, Model of business buyer behaviour, Major types of buying decisions, Buyer marketing in the medical sector, WTO and its implications.

UNIT IV HOSPITAL INFORMATION SYSTEMS & SUPPORTIVE SERVICES

Management Decisions and Related Information Requirement, Clinical Information Systems, Administrative Information Systems, Support Service Technical Information Systems, Hospital Transcription, Medical Records Department, Central Sterilization and Supply Department, Pharmacy-Food Services, Laundry Services.

UNIT V QUALITY AND SAFETY ASPECTS IN HOSPITAL

Quality system - Elements, Implementation of quality system, Organization, Quality system, International Standards ISO 9000 - 9004 - Features of ISO 9001 - ISO 14001 - Certification Management Systems NABH, JCI, NABL, Security - Loss Prevention - Fire Safety - Hazard - Safety - Safety Rules Health Insurance & Managing Health Care - Medical Audit - Hazard and Safety in a hospital Setup.

TOTAL 15 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Explain the principles, practices and areas of application in Hospital Management.

TEXT BOOKS:

- R.C.Goyal, "Hospital Administration and Human Resource Management", Pit - Fourth Edition, 2006 (Units I, II & III).
- G.D.Kunders, "Hospitals - Facilities Planning and Management - TIAH, New Delhi - Fifth Edition, 2007 (Units III, IV & V).

REFERENCES:

- Cesar A.Caceres and Albert Zara, "The Practice of Clinical Engineering, Academic Press New York, 1977.
- Norman Metzger, "Handbook of Health Care Human Resources Management", 2nd Edition, Aspen Publication Inc. Rockville, Maryland, USA, 1990.



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Thalambur, Chennai - 600130

3. Peter Berman "Health Sector Reform in Developing Countries" - Harvard University Press, 1995.
4. William A. Reinke "Health Planning For Effective Management" - Oxford University Press, 1988
5. Blane, David, Brunner, "Health and Social Organization: Towards a Health Policy for the 21st Century" Eric Calrendon Press 2002.
6. Arnold D. Kalcizony & Stephen M. Shortell, "Health Care Management", 6th Edition Cengage Learning, 2011.

GE6351

ENVIRONMENTAL SCIENCE AND ENGINEERING

L T PC
3 0 03

OBJECTIVES:

To the study of nature and the facts about environment.

- To find and implement scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

12

Definition, scope and importance of Risk and hazards; Chemical hazards, Physical hazards, Biological hazards in the environment – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION

10

Definition – causes, effects and control measures of: (a) Air pollution (Atmospheric chemistry- Chemical composition of the atmosphere; Chemical and photochemical reactions in the atmosphere – formation of smog, PAN, acid rain, oxygen and ozone chemistry; - Mitigation procedures- Control of particulate and gaseous emission, Control of SO₂, NO_x, CO and HC) (b) Water pollution : Physical and chemical properties of terrestrial and marine water and their environmental significance; Water quality parameters – physical, chemical and biological; absorption of heavy metals - Water treatment processes. (c) Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – role of an individual in prevention of pollution – pollution case studies – Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES

10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water, dams-benefits and problems – Mineral resources: Use and exploitation,

environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Introduction to Environmental Biochemistry: Proteins –Biochemical degradation of pollutants, Bioconversion of pollutants.
Field study of local area to document environmental assets – river/forest/grassland/hill/mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – 12 Principles of green chemistry- nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air act – Water act – Wildlife protection act – Forest conservation act – The Biomedical Waste (Management and Handling) Rules; 1998 and amendments- scheme of labeling of environmentally friendly products (Ecomark). enforcement machinery involved in environmental legislation- central and state pollution control boards- disaster management: floods, earthquake, cyclone and landslides. Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT

6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare –Environmental impact analysis (EIA)- GIS-remote sensing-role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

OUTCOMES:

Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.

- Public awareness of environment at infant stage.
- Ignorance and incomplete knowledge has led to misconceptions.
- Development and improvement in standard of living has led to serious environmental disasters.

TEXT BOOKS :

1. Gilbert M. Masters, „Introduction to Environmental Engineering and Science“, 2nd edition, Pearson Education (2004).
2. Benny Joseph, „Environmental Science and Engineering“, Tata McGraw-Hill, New Delhi, 2006.

REFERENCES:

1. R.K. Trivedi, „Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standard“, Vol. I and II, EnviroMedia.
2. Cunningham, W.P. Cooper, T.H. Gorhani, „Environmental Encyclopedia“, Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, „Environmental law“, Prentice Hall of India Pvt Ltd, New Delhi, 2007.
4. Rajagopalan, R, „Environmental Studies-From Crisis to Cure“, Oxford University Press (2005)

OBJECTIVES:

- To facilitate the understanding of Quality Management principles and process.

UNIT I INTRODUCTION

9

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Costs of quality.

UNIT II TQM PRINCIPLES

9

Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating

UNIT III TQM TOOLS AND TECHNIQUES I

9

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV TQM TOOLS AND TECHNIQUES II

9

Control Charts - Process Capability - Concepts of Six Sigma - Quality Function Development (QFD) - Taguchi quality loss function - TPM - Concepts, Improvement needs - Performance measures.

UNIT V QUALITY SYSTEMS

9

Need for ISO 9000 - ISO 9001-2008 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service sectors..

TOTAL: 45 PERIODS**OUTCOMES :**


- The student would be able to apply the tools and techniques of quality management to manufacturing and service processes.

TEXT BOOK:

1. Dale H. Besterfield, et al., "Total quality Management", Pearson Education Asia, Third Edition, Indian Reprint 2006.

REFERENCES:

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012.
2. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.
3. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.


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GE6084

HUMANRIGHTS

L TPC3
0 03

OBJECTIVES :

- To sensitize the Engineering students to various aspects of HumanRights.

UNIT I

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights.Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights. 9

UNIT II

Evolution of the concept of Human Rights Magana carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights. 9

UNIT III

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance. 9

UNIT IV

Human Rights in India – Constitutional Provisions / Guarantees. 9

UNIT V

Human Rights of Disadvantaged People – Women, Children, Displaced persons and Disabled persons, including Aged and HIV Infected People. Implementation of HumanRights – National and State Human Rights Commission – Judiciary – Role of NGO"s, Media, Educational Institutions, Social Movements. 9

TOTAL : 45 PERIODS

OUTCOMES:

- Engineering students will acquire the basic knowledge of humanrights.

REFERENCES:

- Kapoor S.K., "Human Rights under International law and Indian Laws", CentralLaw Agency, Allahabad,2014.
- Chandra U., "Human Rights", Allahabad Law Agency, Allahabad,2014.
- UpendraBaxi, The Future of Human Rights, Oxford University Press, NewDelhi.

GE6075

PROFESSIONAL ETHICSINENGINEERING

L T PC
3 0 03

OBJECTIVE:

- To enable the students to create an awareness on Engineering Ethics and HumanValues, to instill Moral and Social Values and Loyalty and to appreciate the rights ofothers.

UNIT I

HUMANVALUES

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stressmanagement. 10

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PRINCIPAL

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UNITII ENGINEERING ETHICS

9

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

UNITIII ENGINEERING ASSOCIAL EXPERIMENTATION

9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNITIV SAFETY, RESPONSIBILITIES AND RIGHTS

9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNITV GLOBAL ISSUES

8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility

OUTCOMES :

TOTAL: 45 PERIODS

Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

TEXTBOOKS:

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001
5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" McGraw Hill education, India Pvt. Ltd., New Delhi 2013.
6. World Community Service Centre, „ Value Education", Vethathiri publications, Erode, 2011

Web sources:

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

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GE6083

DISASTERMANAGEMENT

L TPC3
0 03

OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS

9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR)

9

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority (SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT

9

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA

9


Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS

9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS


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The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management

TEXTBOOK:

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IAS and Sage Publishers, New Delhi, 2010.

REFERENCES

1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy, 2009.

CH6006

ENVIRONMENTAL ENGINEERING

L T PC3 0 0 3

OBJECTIVE:

To provide technical expertise in Environmental Engineering which will enable them to have a career and professional accomplishment in the public or private sector

UNIT I ENVIRONMENT AWARENESS 9
Environment – friendly chemical Process; Hazard and risk analysis; Environmental Audit.

UNIT II CHEMICAL ENGINEERING PROCESSES 9
Unit Operations – application of - Abatement of water pollution; Current strategies to control air pollution; Disposal of solid wastes

UNIT III RECYCLING METHODOLOGY 9
Economic recovery and recycling of waste; Transport fuel- Bio-diesel for a cleaner environment.

UNIT IV CLEAN TECHNOLOGY 9
Towards Eco- friendly products of chemical industry; Pesticides – Their transfer and Transformation in the environment, Biological and electrochemical technology for effluent treatments

UNIT V POLLUTION PREVENTION 9
Mass exchange network synthesis for pollution control and minimization
Implications of environmental constraints for process design, policies for regulation of environmental impacts, Concept of common effluent treatment; Environmental legislations, Role of Government and Industries

OUTCOME:

Upon completion of this course, the students would understand the importance of environmental audit, concepts behind the methodologies to control pollution, the importance of recycling and concepts behind pollution prevention.

TOTAL : 45 PERIODS

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TEXTBOOKS:

1. Rao, C.S Environmental Pollution control Engineering, Wiley- Eastern Ltd. 1991.
2. Peavy H.S. Rowe D.R., and George Technological, Environmental Engineering, McGrawHill Book Company, Ny, 1985.
3. Rao M.N and H.V.N Rao. "Air pollution", Tata McGraw Hill Publishing Co. Ltd. 1989.
4. Theodore L and Buomlore A.J Air pollution control equipments. Prentice Hall Inc, NY. 1982.

REFERENCES:

1. Coulson, J.M. Richardson, J.F and R.K Sinnott, Chemical Engineering Vol. 6, Pergamon Press, 1989.
2. Gilbert M. Mastrs, Introduction to Environmental Engineering and Science, Prentice - Hall of India, New Delhi, 1994.
3. Wahi S.K., Agnihotri A.K and Sharma J.S (Editors) Environmental Management in Petroleum Industry, Wiley Eastern Ltd., New Delhi 1996.
4. Smith, R., "Chemical Process Design", McGraw Hill, New York, 1995.
5. Paul L Bishop (2000) "Pollution Prevention Fundamentals and Practice", McGrawHill, International.

CH6007

WASTEWATER TREATMENT

L TPC 3 0 0 3

OBJECTIVE:

To focus on the wastewater transport system and the theory and design technique for the wastewater treatment process.

UNIT I WASTE WATER TREATMENT AN OVERVIEW 9
Terminology – Regulations – Health and Environment Concerns in waste water management – Constituents in waste water inorganic – Organic and metallic constituents.

UNIT II PROCESS ANALYSIS AND SELECTION 9
Components of waste water flows – Analysis of Data – Reactors used in waste water treatment – Mass Balance Analysis – Modeling of ideal and non ideal flow in Reactors – Process Selection.

UNIT III CHEMICAL UNIT PROCESSES 9
Role of unit processes in waste water treatment chemical coagulation – Chemical precipitation for improved plant performance chemical oxidation – Neutralization – Chemical Storage.

UNIT IV BIOLOGICAL TREATMENT 9
Overview of biological Treatment – Microbial metabolism – Bacterial growth and energetics – Aerobic biological oxidation – Anaerobic fermentation and oxidation – Trickling filters – Rotating biological contractors – Combined aerobic processes – Activated sludge film packing.

UNIT V ADVANCED WASTEWATER TREATMENT 9
Technologies used in advanced treatment – Classification of technologies Removal of Colloids and suspended particles – Depth Filtration – Surface Filtration – Membrane Filtration Absorption – Ion Exchange – Advanced oxidation process.

TOTAL : 45 PERIODS

OUTCOME:

Upon completion of this course, the students would have knowledge on physical/chemical/biological characteristics of and the evaluation technique for

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sewage.

TEXT BOOKS:

1. Waste water Engineering Treatment and Reuse: McGrawHill, G. Tchobanoglous, FI Biston, 2002.
2. Industrial Waste Water Management Treatment and Disposal by Waste Water McGrawHill III Edition 2008.

REFERENCES:

1. Yalkonsky, S.H.; Swarbrick, J.; "Drug and Pharmaceutical Sciences", Vol. I, II, III, IV, V, VI and VII, Marcel Dekkar Inc., New York, 1975.
2. "Remington's Pharmaceutical Sciences", Mack Publishing Co., 1975.

CH6004 AIR POLLUTION AND CONTROL L T PC3 0 0 3

OBJECTIVE:

To enable the students to learn about Air Pollution, effects of air pollution, Global effects, Sampling of pollutants, Meteorology and air pollution, Atmospheric stability, Plume rise and dispersion and Prediction of air quality.

UNIT I INTRODUCTION

9

Air Pollution Regulatory Framework History - Air Pollution Regulatory Framework - Regulatory System - Laws and Regulations - Clean air Act - Provisions for Recent Developments.

UNIT II AIR POLLUTION GASES

9

Measurement fundamentals - chemicals and physical properties - Phase Equilibrium and Convection laws - Incinerators - Design and Performance - Operation and Maintenance - Absorbers - Design operation and improving performances Absorbers.

UNIT III PARTICULATE AIR POLLUTION

9

Particle Collection mechanisms - Fluid particle Dynamics - Particle size Distribution - Efficiency - Gravity Settling chambers Cyclones - Electrostatic precipitators Bannouses

UNIT IV HYBRID SYSTEM

9

Heat electrostatic preprecipitation - Genizing Heat Scrubbers - Dry Scrubbers - Electrostatically Augmented Fabric Filtration

UNIT V AIR POLLUTION CONTROL EQUIPMENT

9

Introduction - Installation - Cost Model.


TOTAL : 45 PERIODS

OUTCOME:

Upon completion of this course, the students would have the knowledge of ambient air pollution, its sources, its effects, and mechanisms for air pollution prevention.

TEXT BOOKS:

1. Air Pollution Control Equipment Louis Theodore, Burley Intuscence 2008.
2. Air Pollution Control CD Cooper and FC. Alley Wairland Press III Edition 2002.
3. Air Pollution Control Engg, Noel de nevey - McGraw Hill.


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MG6091

INDUSTRIAL MANAGEMENT

L T P C
3 0 0 3

OBJECTIVE:

To provide an opportunity to learn basic management concepts essential for business.

UNIT I

INTRODUCTION

9

Management - Definition - Functions - Evolution of Modern Management - Scientific Management Development of Management Thought. Approaches to the study of Management, Forms of Organization - Individual Ownership - Partnership - Joint Stock Companies - Co-operative Enterprises - Public Sector Undertakings, Corporate Frame Work - Share Holders - Board of Directors - Committees - Chief Executive - Trade Union.

UNIT II FUNCTIONS OF MANAGEMENT

9

Planning - Nature and Purpose - Objectives - Strategies - Policies and Planning Premises - Decision Making - Organizing - Nature and Process - Premises - Departmentalization - Line and staff - Decentralization - Organizational culture, Staffing - selection and training - Placement - Performance appraisal - Career Strategy - Organizational Development. Leading - Managing human factor - Leadership - Communication, Controlling - Process of Controlling - Controlling techniques, productivity and operations management - Preventive control, Industrial Safety.

UNIT III ORGANIZATIONAL BEHAVIOUR

9

Definition - Organization - Managerial Role and functions - Organizational approaches, Individual behaviour - causes - Environmental Effect - Behavior and Performance, Perception - Organizational Implications. Personality - Contributing factors - Dimension - Need Theories - Process Theories - Job Satisfaction, Learning and Behavior - Learning Curves, Work Design and approaches.

UNIT IV GROUP DYNAMICS

9

Group Behavior - Groups - Contributing factors - Group Norms, Communication - Process - Barriers to communication - Effective communication, leadership - formal and informal characteristics - Managerial Grid - Leadership styles - Group Decision Making - Leadership Role in Group Decision, Group Conflicts - Types - Causes - Conflict Resolution - Inter group relations and conflict, Organization centralization and decentralization - Formal and informal - Organizational Structures - Organizational Change and Development - Change Process - Resistance to Change - Culture and Ethics.

UNIT V MODERN CONCEPTS

9

Management by Objectives (MBO), Management by Exception (MBE), Strategic Management - Planning for Future direction - SWOT Analysis - Information technology in management - Decisions support system - Business Process Re-engineering (BPR) - Enterprises Resource Planning (ERP) - Supply Chain Management (SCM) - Activity Based Management (ABM).

OUTCOME :

TOTAL : 45 PERIODS

At the end of this course, the students would have knowledge on the basic management principles to become management(s) professional.

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TEXTBOOKS:

1. Herald Knottzand Heinz Wehrich, 'Essentials of Management', Tata McGraw Hill Education Pvt. Ltd., 2010.
2. Stephen P. Robbins, 'Organization Behaviour', Pearson Education Inc., 13 edition, 2010.

REFERENCES:

1. Ties, AF, Stoner and R. Edward Freeman, 'Management' Prentice Hall of India Pvt. Ltd. New Delhi 110 011, 1992
2. Joseph J, Massie, 'Essentials of Management' Prentice Hall of India Pvt. Ltd. 1985.
3. P.C. Tripathi & P.N. Reddy, 'Principles of Management', Tata McGraw Hill, 2006.

CE6503

ENVIRONMENTAL ENGINEERING I

L TPC3 0
03

OBJECTIVES:

- To make the students conversant with principles of water supply, treatment and distribution

UNIT I PLANNING FOR WATER SUPPLY SYSTEM

8

Public water supply system - Planning - Objectives - Design period - Population forecasting - Water demand - Sources of water and their characteristics - Surface and Groundwater - Impounding Reservoir Well hydraulics - Development and selection of source - Water quality - Characterization and standards - Impact of climate change.

UNIT II CONVEYANCE SYSTEM

7

Water supply - intake structures - Functions and drawings - Pipes and conduits for water - Pipe materials - Hydraulics of flow in pipes - Transmission main design - Laying, jointing and testing of pipes - Drawings appurtenances - Types and capacity of pumps - Selection of pumps and pipe materials.

UNIT III WATER TREATMENT

12

Objectives - Unit operations and processes - Principles, functions design and drawing of Chemical feeding, Flash mixers, flocculators, sedimentation tanks and sand filters - Disinfection - Residue Management - Construction and Operation & Maintenance aspects of Water Treatment Plants.

UNIT IV ADVANCED WATER TREATMENT

9

Principles and functions of Aeration - Iron and manganese removal, Defluoridation and demineralization - Water softening - Desalination - Membrane Systems - Recent advances.

UNIT V WATER DISTRIBUTION AND SUPPLY TO BUILDINGS

9

Requirements of water distribution - Components - Service reservoirs - Functions and drawings - Network design - Economics - Computer applications - Analysis of distribution networks - Appurtenances - operation and maintenance - Leak detection, Methods. Principles of design of water supply in buildings - House service connection - Fixtures and fittings - Systems of plumbing and drawings of types of plumbing.

TOTAL: 45 PERIODS

OUTCOMES:

The students completing the course will have

- an insight into the structure of drinking water supply systems, including water transport, treatment and distribution
- an understanding of water quality criteria and standards, and their relation to public health,

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- the ability to design and evaluate water supply project alternatives on basis of chosen selection criteria

TEXTBOOKS:

- Garg, S.K., "Environmental Engineering", Vol. 1 Khanna Publishers, New Delhi, 2005.
- Modi, P.N. "Water Supply Engineering", Vol. I Standard Book House, New Delhi, 2005.
- Punmia, B.C., Ashok K Jain and Arun K Jain, "Water Supply Engineering", Laxmi Publications Pvt. Ltd., New Delhi, 2005

REFERENCES:

- Government of India, "Manual on Water Supply and Treatment", CPHEEO, Ministry of Urban Development, New Delhi, 2003
- Syed R. Qasim and Edward M. Motley Guang Zhu, "Water Works Engineering Planning", Design and Operation, Prentice Hall of India Private Limited, New Delhi, 2006.

CE6605

ENVIRONMENTAL ENGINEERING II

L TPC3 0
03

OBJECTIVES:

- To educate the students on the principles and design of Sewage Collection, Conveyance, treatment and disposal.

UNIT I PLANNING FOR SEWERAGE SYSTEMS

7

Sources of wastewater generation – Effects – Estimation of sanitary sewage flow – Estimation of storm runoff – Factors affecting Characteristics and composition of sewage and their significance – Effluent standards – Legislation requirements.

UNIT II SEWER DESIGN

8

Sewerage – Hydraulics of flow in sewers – Objectives – Design period - Design of sanitary and storm sewers – Small bore systems - Computer applications – Laying, joining & testing of sewers – appurtenances – Pumps – selection of pumps and pipe Drainage -. Plumbing System for Buildings – One pipe and two pipes system.

UNIT III PRIMARY TREATMENT OF SEWAGE

9

Objective – Selection of treatment processes – Principles, Functions, Design and Drawing of Units - Onsite sanitation - Septic tank with dispersion - Grey water harvesting – Primary treatment – Principles, functions design and drawing of screen, grit chambers and primary sedimentation tanks – Construction, operation and Maintenance aspects.

UNIT IV SECONDARY TREATMENT OF SEWAGE

12

Objective – Selection of Treatment Methods – Principles, Functions, Design and Drawing of Units - Activated Sludge Process and Trickling filter – Oxidation ditches, UASB – Waste Stabilization Ponds – Reclamation and Reuse of sewage - sewage recycle in residential complex - Recent Advances in Sewage Treatment – Construction and Operation & Maintenance of Sewage Treatment Plants.

UNIT V DISPOSAL OF SEWAGE AND SLUDGE MANAGEMENT

9

Standards for Disposal - Methods – dilution – Self purification of surface water bodies – Oxygen sag curve – Land disposal – Sludge characterization – Thickening – Sludge digestion – Biogas recovery – Sludge Conditioning and Dewatering – disposal – Advances in Sludge Treatment and disposal.

OUTCOMES:

TOTAL: 45 PERIODS

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The students completing the course will have

- ability to estimate sewage generation and design sewer system including sewage pumping stations
- required understanding on the characteristics and composition of sewage, self purification of streams
- ability to perform basic design of the unit operations and processes that are used in sewage treatment

TEXTBOOKS:

1. Garg, S.K., "Environmental Engineering" Vol. II, Khanna Publishers, New Delhi, 2003.
2. Punmia, B.C., Jain, A.K., and Jain, A., "Environmental Engineering", Vol. II, Lakshmi Publications, New Delhi, 2005.

REFERENCES:

1. "Manual on Sewerage and Sewage Treatment", CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1997.
2. Metcalf & Eddy, "Wastewater Engineering" – Treatment and Reuse, Tata McGraw Hill Company, New Delhi, 2003.
3. Karia G L & Christian R A, "Wastewater Treatment", Prentice Hall of India, New Delhi, 2013.

Noida, Up, 2008

1. Dilip Kumar Majumdar, "Irrigation Water Management", Prentice-Hall of India, New Delhi, 2008.
2. Asawa, G.L., "Irrigation Engineering", New Age International Publishers, New Delhi, 2000.

MG6851

PRINCIPLES OF MANAGEMENT

LTPC3 0
0 3

OBJECTIVES:

- To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS

9

Definition of Management – Science or Art – Manager Vs Entrepreneur - types of managers - managerial roles and skills – Evolution of Management – Scientific, human relations, system and contingency approaches – Types of Business organization - Sole proprietorship, partnership, company-public and private sector enterprises - Organization culture and Environment – Current trends and issues in Management.

UNIT II PLANNING

9

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

UNIT III ORGANISING

9

Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Job Design - Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management, Career planning and management.


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UNITIV DIRECTING

Foundations of individual and group behaviour – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication –communication and IT.

9

UNITVCONTROLLING

System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

9

TOTAL: 45 PERIODS

OUTCOMES:

- Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have some basic knowledge on international aspect of management

TEXTBOOKS:

- Stephen P. Robbins & Mary Coulter, "Management", 10th Edition, Prentice Hall (India) Pvt. Ltd., 2009.
- JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", 6th Edition, Pearson Education, 2004.

REFERENCES:

- Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" 7th Edition, Pearson Education, 2011.
- Robert Kreitner & Mamata Mohapatra, "Management", Biztantra, 2008.
- Harold Koontz & Heinz Weihrich "Essentials of management" Tata McGraw Hill, 1998.
- Tripathy PC & Reddy PN, "Principles of Management", Tata McGraw Hill, 1999

EN6801

ENVIRONMENTAL IMPACT ASSESSMENT

L TPC3 0
03

OBJECTIVES:

- To impart knowledge on Environmental management and Environmental Impact Assessment.

UNITI INTRODUCTION

8

Impact of development projects – Sustainable development- Need for Environmental Impact Assessment (EIA) - Environmental Impact Statement (EIS) – EIA capability and limitations – Legal provisions on EIA- Stages of EIA, Types of EIA

UNITII METHODOLOGIES

9

Methods of EIA – Check lists – Matrices – Networks – Cost-benefit analysis – Analysis of alternatives

UNITIII PREDICTION AND ASSESSMENT

9

Assessment of Impact on land, water, air, social & cultural activities and on flora & fauna- Mathematical models- Public participation

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UNITIV ENVIRONMENTALMANAGEMENTPLAN

9

Plan for mitigation of adverse impact on environment – Options for mitigation of impact on water, air, land and on flora & fauna - Addressing the issues related to the Project Affected People. Post project monitoring

UNITV CASESTUDIES

10

EIA for infrastructure projects – Dams – Highways – Multi-storey Buildings – Water Supply and Drainage Projects – Waste water treatment plants, STP.

TOTAL : 45PERIODS

OUTCOMES:

The students completing the course will have ability to

- carry out scoping and screening of developmental projects for environmental and social assessments
- explain different methodologies for environmental impact prediction and assessment
- plan environmental impact assessments and environmental management plans
- evaluate environmental impact assessment reports

TEXTBOOKS:

1. Canter, R.L., "Environmental Impact Assessment", McGraw Hill Inc., New Delhi, 1996.
2. Shukla, S.K. and Srivastava, P.R., "Concepts in Environmental Impact Analysis", Common Wealth Publishers, New Delhi, 1992.

REFERENCES:

1. John G. Rau and David C Hooten "Environmental Impact Analysis Handbook", McGrawHill Book Company, 1990.
2. "Environmental Assessment Source book", Vol. I, II & III. The World Bank, Washington, D.C., 1991.
3. Judith Petts, "Handbook of Environmental Impact Assessment Vol. I & II", Blackwell Science, 1999.

CE6023

INDUSTRIALWASTEMANAGEMENT

LTPC3 0

0 3

OBJECTIVES:

- To impart knowledge on sources and characteristics of various industrial wastes and strategies for its prevention and control

UNITI INTRODUCTION

8

Types of industries and industrial pollution – Characteristics of industrial wastes – Population equivalent – Bioassay studies – effects of industrial effluents on streams, sewer, land, sewage treatment plants and human health – Environmental legislations related to prevention and control of industrial effluents and hazardous wastes

UNITII CLEANERPRODUCTION

8

Waste management Approach – Waste Audit – Volume and strength reduction – Material and process modifications – Recycle, reuse and byproduct recovery – Applications.

UNITIII POLLUTION FROMMAJORINDUSTRIES

9

Sources, Characteristics, waste treatment flow sheets for selected industries such as Textiles, Tanneries, Pharmaceuticals, Electroplating industries, Dairy, Sugar, Paper, distilleries, Steel plants, Refineries, fertilizer, thermal power plants – Wastewater reclamation concepts

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UNITIV TREATMENT TECHNOLOGIES

11

Equalisation – Neutralisation – Removal of suspended and dissolved organic solids - Chemical oxidation – Adsorption - Removal of dissolved inorganics – Combined treatment of industrial and municipal wastes – Residue management – Dewatering – Disposal

UNITV HAZARDOUS WASTE MANAGEMENT

9

Hazardous wastes - Physico chemical treatment – solidification – incineration – Secure land fills

TOTAL: 45 PERIODS

OUTCOMES:

The students completing the course will have

- an insight into the pollution from major industries including the sources and characteristics of pollutants
- ability to plan minimization of industrial wastes
- ability to design facilities for the processing and reclamation of industrial wastewater

TEXTBOOKS:

1. Rao M. N. & Dutta A. K., "Wastewater Treatment", Oxford - IBH Publication, 1995.
2. Eckenfelder W.W. Jr., "Industrial Water Pollution Control", McGraw Hill Book Company, New Delhi, 2000.
3. Patwardhan. A.D., "Industrial Wastewater Treatment", Prentice Hall of India, New Delhi 2010.

REFERENCES:

1. Shen T.T., "Industrial Pollution Prevention", Springer, 1999.
2. Stephenson R.L. and Blackburn J.B., Jr., "Industrial Wastewater Systems Hand book", Lewis Publisher, New York, 1998
3. Freeman H.M., "Industrial Pollution Prevention Hand Book", McGraw Hill Inc., New Delhi, 1995.
4. Bishop, P.L., "Pollution Prevention: Fundamental & Practice", McGraw Hill, 2000.
5. Pandey, "Environmental Management" Vikas Publications, 2010.
6. "Industrial Wastewater Management, Treatment and Disposal", (WEF - MOP - FD3) McGraw Hill, 2008.

CE6011

AIR POLLUTION MANAGEMENT

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0 3

OBJECTIVES:

- This subject covers the sources, characteristics and effects of air and noise pollution and the methods of controlling the same. The student is expected to know about source inventory and control mechanism.

UNITI SOURCES AND EFFECTS OF AIR POLLUTANTS

9

Classification of air pollutants – Particulates and gaseous pollutants – Sources of air pollution – Source inventory – Effects of air pollution on human beings, materials, vegetation, animals – global warming-ozone layer depletion, Sampling and Analysis – Basic Principles of Sampling – Source and ambient sampling – Analysis of pollutants – Principles.

UNITII DISPERSION OF POLLUTANTS

9

Elements of atmosphere – Meteorological factors – Wind roses – Lapse rate - Atmospheric stability and turbulence – Plume rise – Dispersion of pollutants – Dispersion models – Applications.

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UNIT III AIR POLLUTION CONTROL

12

Concepts of control – Principles and design of control measures – Particulates control by gravitational, centrifugal, filtration, scrubbing, electrostatic precipitation – Selection criteria for equipment – gaseous pollutant control by adsorption, absorption, condensation, combustion – Pollution control for specific major industries.

UNIT IV AIR QUALITY MANAGEMENT

8

Air quality standards – Air quality monitoring – Preventive measures – Air pollution control efforts – Zoning – Town planning regulation of new industries – Legislation and enforcement – Environmental Impact Assessment and Air quality

UNIT V NOISE POLLUTION

7

Sources of noise pollution – Effects – Assessment – Standards – Control methods – Prevention

TOTAL: 45 PERIODS

OUTCOMES:

The students completing the course will have

- an understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
- ability to identify, formulate and solve air and noise pollution problems
- ability to design stacks and particulate air pollution control devices to meet applicable standards.

TEXTBOOKS:

1. Anjaneyulu, D., "Air Pollution and Control Technologies", Allied Publishers, Mumbai, 2002.
2. Rao, C.S. Environmental Pollution Control Engineering, Wiley Eastern Ltd., New Delhi, 1996.
3. Rao M.N., and Rao H. V. N., Air Pollution Control, Tata McGraw Hill, New Delhi, 1996.

REFERENCES:

1. Heumann, W.L., "Industrial Air Pollution Control Systems", McGraw Hill, New York, 1997.
2. Mahajan S.P., "Pollution Control in Process Industries", Tata McGraw Hill Publishing Company, New Delhi, 1991.
3. Peavy S.W., Rowe D.R. and Tchobanoglous G. "Environmental Engineering", McGraw Hill, New Delhi, 1985.
4. Garg, S.K., "Environmental Engineering Vol. II", Khanna Publishers, New Delhi, 1998
5. Mahajan, S.P., "Pollution Control in Process Industries", Tata McGraw Hill, New Delhi,

GE6082 INDIAN CONSTITUTION AND SOCIETY L T P C 3 0 0 3

OBJECTIVES:

- To know about Indian constitution.
- To know about central and state government functionalities in India.
- To know about Indian society.

UNIT I INTRODUCTION

9

Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.

UNIT II STRUCTURE AND FUNCTION OF CENTRAL GOVERNMENT

9

Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

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UNIT III STRUCTURE AND FUNCTION OF STATE GOVERNMENT 9
State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State
Legislature – Judicial System in States – High Courts and other Subordinate Courts.

UNIT IV CONSTITUTION FUNCTIONS 9
Indian Federal System – Center – State Relations – President's Rule – Constitutional Amendments –
Constitutional Functionaries - Assessment of working of the Parliamentary System in India.

UNIT V INDIAN SOCIETY 9
Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India;
Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women,
Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, students will be able to:

- Understand the functions of the Indian government
- Understand and abide the rules of the Indian constitution.
- Understand and appreciate different culture among the people.

TEXTBOOKS:

1. Durga Das Basu, "Introduction to the Constitution of India", Prentice Hall of India, New Delhi.
2. R.C. Agarwal, (1997) "Indian Political System", S.Chand and Company, New Delhi.
3. Maciver and Page, " Society: An Introduction Analysis ", Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, (1997) "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, New Delhi.

REFERENCES:

1. Sharma, Brij Kishore, "Introduction to the Constitution of India", Prentice Hall of India, New Delhi.
2. U.R.Gahai, "Indian Political System ", New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, "Indian Social Problems ", Media Promoters and Publishers
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