



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

CIVIL ENGINEERING
COURSE STRUCTURE

IV YEAR
SEMESTER

S. No.	Subject	T	P	Credits
1	Geotechnical Engineering-II	4	-	4
2	Design & Drawing of Irrigation Structures	4	-	4
3	Environmental Engineering	4	-	4
4	Remote Sensing and GIS Applications	4	-	4
5	ELECTIVE –I a) Earthquake Resistant Design b) Ground Improvement Techniques c) Urban Transportation Planning	4	-	4
6	OPEN ELECTIVE a) Air Pollution and Control b) Disaster Management c) Industrial Water & Waste Water Management d) Architecture and Town Planning	4	-	4
7	GIS and CAD Lab	-	3	2
8	Water and Wastewater Engineering Lab	-	3	2
	Total			28



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B.Tech. Civil Engineering. I-Sem.

GEOTECHNICAL ENGINEERING – II

UNIT – I

SOIL EXPLORATION: Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests– Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

SLOPE STABILITY: Infinite and finite earth slopes in sand and clay – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number-Stability of slopes of dams and embankments - different conditions.

UNIT – III

EARTH PRESSURE THEORIES: Rankine's & Coulomb's theory of earth pressure, Rehmann's graphical method – Culmann's graphical method – Friction circle method - earth pressures in layered soils.

UNIT-IV

RETAINING WALLS: Types of retaining walls – Design approach of gravity retaining wall, cantilever retaining wall, bulk heads, anchored bulk heads

UNIT – V

SHALLOW FOUNDATIONS: Bearing capacity – criteria for determination of bearing capacity – factors influencing bearing capacity – analytical methods to determine bearing capacity - Terzaghi, Meyerhof, and Skempton and IS Methods

UNIT-VI

SHALLOW FOUNDATIONS – SETTLEMENT CRITERIA: Safe bearing pressure based on N_6 value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures - Settlement Analysis.

UNIT -VII

PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae– Pile load tests - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT-VIII

w.e.f.2010-2011 academic year

WELL FOUNDATIONS: Types – Different shapes of well – Components of well – functions – forces acting on well foundations - Design Criteria – construction and Sinking of wells – Tilt and shift.

TEXT BOOKS:

1. Das, B.M., - (2011) Principles of Foundation Engineering –6th edition (Indian edition)
Cengage learning
2. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).

REFERENCE BOOKS:

1. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing Company, Newyork.
2. Theory and practice of foundation design by N.N.SOM & S.C.DAS PHI Learning Private limited.

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w.e.f.2010-2011 academic year



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B.Tech. Civil Engineering. I-Sem.

DESIGN AND DRAWING OF IRRIGATION STRUCTURES

Design and drawing of

1. Surplus weir.
2. Tank sluice with a tower head
3. Canal drop-Notch type.
4. Canal regulator
5. Under tunnel
6. Syphon aqueduct type III.

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination is three hours.

TEXT BOOKS:

1. Water resources engineering-principles and practice by C.Satyanarayana Murthy, New age International publishers.

REFERENCE BOOKS:

1. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.
2. Irrigation and water power engineering by B.C Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B.Tech. Civil Engineering. I-Sem.

ENVIRONMENTAL ENGINEERING

UNIT – I

Air Pollution – Sources of pollution – Effects on human beings – Air pollution Control Methods – Particulate control devices – General Methods of Controlling Gaseous Emissions – Air Emission standards.

UNIT – II

Special Treatment Methods – Adsorption – Reverse Osmosis – Defluoridation – Ion exchange – Ultra Filtration - Nitrification and Denitrification – Removal of Phosphates.

UNIT –III

Theories of industrial waste water management – Volume reduction – Strength reduction – Neutralization – Equalization – Proportioning – Common Effluent Treatment Plants - Recirculation of industrial wastes – Effluent standards.

UNIT – IV

Solid Waste Management – sources, composition and properties of solid waste – collection and handling – separation and processing - Solid waste disposal methods – Land filling – Incineration - Composting.

UNIT – V

Hazardous Waste – Nuclear waste – Biomedical wastes – Electronic wastes - Chemical wastes – Disposal and Control methods.

UNIT – VI

Noise Pollution – Effects of Noise, Noise standards, Measurement and control methods – Reducing residential and industrial noise – ISO14000

UNIT – VII

Environmental Sanitation: Environmental Sanitation Methods for Hostels and Hotels, Hospitals, Swimming pools and public bathing places, Melas and fares, Schools and Institutions, Rural Sanitation.

UNIT – VIII

Environmental Impact Assessment – Impact evaluation and analysis, EIA Methodologies, Assessment of Impacts on surface water, Air and biological Environments - Environmental audit, preparation of Environmental impact statement – Case studies.

TEXT BOOKS:

1. Environmental Science and Engineering by J.G. Henry and G.W. Heinke – Pearson Education.
2. Environmental Engineering by Mackenzie L Davis & David A Cornwell by McGraw Hill Publishing.

REFERENCE BOOKS:

1. Physico –Chemical process for water quality control by Weber
2. Air Pollution and Control by M.N. Rao & H.N. Rao
3. Environmental Impact Assessment by Y. Anjaneyulu, BS Publications.
4. Environmental Engineering by Gerard Kiley, Tata McGraw Hill.
5. Social and Preventive Medicine by Park and Park.
6. Environmental Sanitation by KVSG Murali Krishna, Reem Publications, New Delhi.
7. Liquid waste of Industry by Nemerow
8. Unit Operations and Processes in Environmental Engineering by Reynolds. Richard – Cengage Learning.
9. Environmental Engineering, 4th Edition by Ruth F. Weiner and Robin Matthews – Elsevier.



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B.Tech. Civil Engineering. I-Sem.

REMOTE SENSING AND GIS APPLICATIONS

UNIT – I

Introduction to remote sensing: Basic components of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces.

UNIT – II

Sensors and platforms: introduction, passive sensor, active sensor, airborne remote sensing, spaceborne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential.

UNIT – III

Image analysis: introduction, elements of visual interpretations, digital image processing- image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT – IV

Geographic Information System: Introduction, key components, application areas of GIS, map projections.

UNIT- V

Data entry and preparation: spatial data input, raster data models, vector data models, raster versus vector.

UNIT – VI

Spatial data analysis: introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing.

UNIT – VII

RS and GIS applications I: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications.

UNIT – VIII

RS and GIS applications II: Hydrology-flood zone delineation and mapping, groundwater prospects and recharge, reservoir storage estimation.

TEXT BOOKS:

1. Remote sensing and GIS by Basudeb Bhatta, Oxford University Press
2. Remote sensing and image interpretation by Thomas M. Lillesand and Ralph W. Kiefer,
John Wiley and Sons Inc.
3. Principals of Geo physical Information Systems – Peter A. Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.

REFERENCE BOOKS:

1. Remote sensing by Robert A. Schowengerdt, Elsevier publishers.
2. Remote Sensing and its applications by LRA Narayana University Press 1999.
3. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yongg, Prentice Hall (India) Publications.
4. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU KAKINADA 2001, B.S.Publications.
5. GIS by Kang – tsung chang, TMH Publications & Co.,
6. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
7. Fundamental of GIS by Mechanical designs John Wiley & Sons.



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B.Tech. Civil Engineering. I-Sem.

EARTHQUAKE RESISTANT DESIGN
(ELECTIVE – I)

UNIT – I

Earthquake Engineering: - Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc - Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelegrams.

UNIT – II

Introduction to Structural Dynamics: – Theory of vibrations – Lumped mass and continuous mass systems – Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Undamped and damped free vibration – Damping – Response to harmonic excitation – Concept of response spectrum.

UNIT – III

Multi-Degree of Freedom (MDOF) Systems: - Formulation of equations of motion – Free vibration – Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT – IV

Earthquake Analysis : - Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi-storied buildings – Use of response spectra.

UNIT – V

Codal Design Provisions: - Review of the Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings – Earthquake design philosophy – Assumptions – Design by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

UNIT – VI

Codal Detailing Provisions: - Review of the Indian Seismic codes IS: 4326 and IS: 13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

UNIT – VII

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Seismic Planning: - Plan Configurations – Torsion Irregularities – Re-entrant corners – Non-parallel systems– Diaphragm Discontinuity – Vertical Discontinuities in load path – Irregularity in strength and stiffness – Mass Irregularities –Vertical Geometric Irregularity – Proximity of Adjacent Buildings.

UNIT – VIII

Shear walls: - Types – Design of Shear walls as per IS: 13920 – Detailing of reinforcements.

TEXT BOOKS:

1. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande –
Printice Hall of India, New Delhi.
2. Dynamics of Structures by A.K.Chopra – Pearson Education, Indian Branch, Delhi.
3. Earthquake Resistant Design of Structures by S.K.Duggal, Oxford university press.

REFERENCE BOOKS:

1. Dynamics of Structures – Clough & Penzien, McGraw Hill – International Edition.
2. Earthquake Resistant Design of Structures by S.K.Duggal
3. Earthquake Tips by C.V.R.Murty, I.I.T. Kanpur.
4. Structural Dynamics by Mario Paaz.

IS Codes: IS: 1893, IS: 4326 and IS: 13920.



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IV Year B.Tech. Civil Engineering. I-Sem.

GROUND IMPROVEMENT TECHNIQUES
(ELECTIVE -I)

UNIT - I

NEED & OBJECTIVES OF GROUND IMPROVEMENT TECHNIQUES.

DEWATERING: Sumps and interceptor ditches- single, multi stage well points - vacuum well points-Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains –Electro-osmosis.

UNIT -II

GROUTING: Objectives of grouting- grouts and their properties- grouting methods- ascending, descending and stage grouting hydraulic fracturing in soils and rocks- post grout test.

UNIT - III

IN-SITU DENSIFICATION METHODS IN GRANULAR SOILS: – Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

UNIT - IV

IN-SITU DENSIFICATION METHODS IN COHESIVE SOILS: – preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT - V

STABILIZATION: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum, use of industrial wastes.

UNIT - VI

REINFORCED EARTH: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

UNIT - VII

Geosynthetics: Geotextiles- Types, Functions, Properties and applications – geogrids and geomembranes – functions, properties and applications.

UNIT - VIII

Expansive soils: Problems of expansive soils – tests for identification – methods of determination of swell pressure.Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

TEXT BOOKS:

1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi

REFERENCES BOOKS:

1. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida, USA.
2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercey, USA

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B.Tech. Civil Engineering. I-Sem.

ARCHITECTURE AND TOWN PLANNING
(ELECTIVE –I)

UNIT – I

History of Architecture: Western Architecture: Egyptian, Greek, Roman Architectures- Orders. Indian Architecture: Vedic age, Indus valley civilization– Buddhist period: Stambas, Stupa, Toranas, Chaityas, Viharas – Hindu temples: Dravidian and Indo Aryan Styles- Principle factors- Temple of Aihole, Mahabalipuram, Madurai, Deogarh, Bhuvaneshwar, Mount Abu. Indo Sarsanic Architecture: Mosque - Palace - Fort - Tomb.

UNIT – II

Architectural Design: Principles of designing – Composition of Plan – relationship between plan and elevation- building elements, form, surface texture, mass, line, color, tone- Principles of Composition: Unity, contrast, proportion, scale, balance, circulation, rhythm, character, expression.

UNIT - III

Principles of Planning: Principles of planning a residence- site selection, site orientation- aspect, prospect, grouping, circulation, privacy, furniture requirements, services and other factors.

UNIT - IV

Post-classic Architecture: Introduction of post-classic architecture- contribution of eminent architects to modern period.

Brief summary of post-classic architecture – Indian and western architectural contribution of eminent architects: Edward Lutyens, Le Corbusier, Frank Lloyd Wright, Walter Groping, Vender Rohe, Caarihan, Nervi, Oscar Niemyer, Edward Durell Stone.

UNIT – V

Historical Back Ground of Town Planning: Town planning in India – town plans of mythological Manasa – town plans of ancient Indian towns: Harappa, Mohenjodaro, Pataliputra, Vijayanagara, Delhi –Town plans of Egypt, Acropolis, Jerusalem, Mecca, Rome, Paris, London, New York, Istanbul.

UNIT – VI

Modern Town Planning: Zoning- Roads and road traffic- Housing- Slums, Parks, Play grounds- Public Utility Services- Surveys and maps for planning- Neighbourhood Planning.

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UNIT - VII

Standards of Town planning: Planning new towns, planning standards and specifications, national and regional planning, town planning and legislation-planning regulations and limitations.

UNIT – VIII

Land Scaping and Expansion of Towns: Land scaping for the towns, horizontal and vertical expansion of towns- garden cities, satellite towns-floating towns- sky scrapers-pyramidal cities.

REFERENCE BOOKS:

ARCHITECTURE

1. The great ages of World Architecture by G.K. Hiraskar.
2. Drafting and Design for Architecture by Hepler, Cengage Learning
3. Architect's Portable Handbook by John Patten Guthrie – McGraw.Hill International Publications.
4. Indian Architecture – Vol. I and II by Percy Brown, Taraporevala Publications, Bombay.
5. Planning and Design of Buildings – Section of Architecture by Y. S. Sane.
6. Mordern Ideal Homes for India by R. S. Deshpande.

TOWN PLANNING

1. Fundamentals of Town Planning – G.K.Haraskar.
2. Town and County Planning – A.J.Brown and H.M.Sherrard.
3. Town Design – Federik Glibbard, Architectural press, London.



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GIS AND CAD LABORATORY.

GIS:

SOFTWARES:

1. Arc GIS 9.0
 2. ERDAS 8.7
 3. Mapinfo 6.5
- Any one or Equivalent.

EXERCISES IN GIS:

1. Digitization of Map/Topsheet
2. Creation of thematic maps.
3. Study of features estimation
4. Developing Digital Elevation model
5. Simple applications of GIS in water Resources Engineering & Transportation Engineering.

COMPUTER AIDED DESIGN AND DRAWING:

SOFTWARE:

1. STAAD PRO / Equivalent/
2. STRAAP
3. STUDDS

EXERCISES:

1. 2-D Frame Analysis and Design
2. Steel Tabular Truss Analysis and Design
3. 3-D Frame Analysis and Design
4. Retaining Wall Analysis and Design
5. Simple tower Analysis and Design

TEXT BOOK:

1. Concept and Techniques of GIS by C.P.L.O. Albert, K.W. Yong, Printice Hall Publishers.



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B.Tech. Civil Engineering. I-Sem.

WATER AND WASTEWATER ENGINEERING LAB.

LIST OF EXPERIMENTS

1. Determination of pH and Electrical Conductivity (Salinity) of Water and Soil.
 2. Determination and estimation of Total Hardness – Calcium & Magnesium.
 3. Determination of Alkalinity/Acidity.
 4. Determination of Chlorides in water and soil.
 5. Determination and Estimation of total solids, organic solids and inorganic solids and settleable solids by Imhoff Cone.
 6. Determination of Iron.
 7. Determination of Dissolved Oxygen with D.O. Meter & Wrinklers Method and B.O.D.
 8. Determination of Nitrogen.
 9. Determination of total Phosphorous.
 10. Physical parameters – Temperature, Colour, Odour, Turbidity, Taste.
 11. Determination of C.O.D.
 12. Determination of Optimum coagulant dose.
 13. Determination of Chlorine demand.
 14. Presumptive Coliform test.
- NOTE: At least 10 of the above experiments are to be conducted.

LIST OF EQUIPMENTS

- 1) pH meter
- 2) Turbidity meter
- 3) Conductivity meter
- 4) Hot air oven
- 5) Muffle furnace
- 6) Dissolved Oxygen meter
- 7) U – V visible spectrophotometer
- 8) COD Reflux Apparatus
- 9) Jar Test Apparatus
- 10) BOD incubator
- 11) Autoclave
- 12) Laminar flow chamber
- 13) Hazen's Apparatus

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TEXT BOOKS:

1. Standard Methods for Analysis of Water and Waste Water – APHA
2. Chemical Analysis of Water and Soil by KVSG Murali Krishna, Reem Publications, New Delhi

REFERENCE BOOKS:

1. Relevant IS Codes.
2. Chemistry for Environmental Engineering by Sawyer and Mc. Carty.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
IV Year B.Tech. Civil Engineering. I-Sem.

AIR POLLUTION AND CONTROL
(OPEN ELECTIVE)

UNIT – I

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Measurements of Pollution - Classifications – Natural and Artificial –Primary and Secondary, point and Non- Point, Line and Areal Sources of air pollution- stationary and mobile sources.

UNIT – II

Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains and Ozone Holes - Effects on art treasures.

UNIT-III

Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like SO_x, NO_x, CO and HC - Air-fuel ratio. Computation and Control of products of combustion.

UNIT – IV

Meteorology and plume Dispersion; Properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity - Influence of Meteorological phenomena on Air Quality - Wind rose diagrams.

UNIT-V

Lapse Rates, Pressure Systems, Winds and moisture, Inversions and Plume behavior; Plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-VI

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control Equipments – Settling Chambers, Centrifugal separators – Reverse Flow Cyclones, Fabric filters – Bag House, Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – VII

General Methods of Control of NO_x and SO_x emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT – VIII

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Ambient Air Quality Management – Monitoring of SPM, SO₂; NO and CO - Stack Monitoring for flue gases - Micro-meteorological monitoring - Emission Standards.

TEXT BOOKS:

1. Air Pollution by M.N. Rao and H.V.N. Rao – Tata McGraw Hill Company.
2. Air Pollution and Control by KVSG Murali Krishna.

REFERENCE BOOKS:

- 1 An Introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.
2. Air pollution by Wark and Warner - Harper & Row, New York.

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DISASTER MANAGEMENT
(OPEN ELECTIVE)

UNIT-I

Disaster Management An Over Views: Introduction of DM – Inter disciplinary -nature of the subject – Hyogo frame of work of action (HFA) (2005-2015) – Five priorities for action.

UNIT-II

Natural Hazards And Disaster And Their Management: Case study methods of the following: floods, draughts – Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides.

UNIT-III

Man Made Disaster And Their Management Along With Case Study Methods Of The Following: Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrorism -threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases & Aids and their management.

UNIT-IV

Risk And Vulnerability: Building codes and land use planning – social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, climate change risk rendition – financial management of disaster – related losses.

UNIT-V

Role Of Technology In Disaster Managements: Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations- roads and bridges- mitigation programme for earth quakes –flowchart , geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and training- transformable indigenous knowledge in disaster reduction.

UNIT-VI

Education And Community Preparedness: Education in disaster risk reduction- Essentials of school disaster education-Community capacity and disaster resilience- Community based disaster recovery -Community based disaster management and social capital-Designing resilience- building community capacity for action

UNIT-VII

Multi-sectional Issues: Impact of disaster on poverty and deprivation-Climate change adaptation and human health -Exposure , health hazards and environmental risk-Forest management and disaster risk reduction.-Institutional capacity in disaster management - The Red cross and red crescent movement.-Corporate sector and disaster risk reduction-A community focused approach

UNIT-VIII

Field Visit: Visit to a local area/site where natural or manmade hazard has occurred and prepare a report with the following details i) location of site ii) nature of the hazard(natural or manmade) iii) details of loss of life and property iv) response from the government/NGO etc. v) whether the response is adequate or not vi) the role of technology in risk reduction vii) suggestions for improvement of disaster response/preventive measures viii) conclusions

TEXT BOOKS:

1. Disaster management – Global challenges and local solutions. Edited by Rajib shah and R R Krishnamurthy(2009) published by universities press.
2. Disaster management – future challenges and oppurtutines(2007) editor by Jagbir singh. Published by I K international publishing house pvt.ltd.

REFERENCE BOOK:

1. Disaster management edited by H K Gupta (2003) published by universities press



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INDUSTRIAL WATER AND WASTE WATER MANAGEMENT
(OPEN ELECTIVE)

UNIT – I

Quality requirements of boiler and cooling waters – Quality requirements of process water for Textiles – Food processing and Brewery Industries – Boiler and Cooling water requirements and treatment methods.

UNIT – II

Basic Theories of Industrial Wastewater Management – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage – consequent problems.

UNIT – III

Industrial waste water discharges into Streams, Lakes and oceans and problems, Land treatment - Recirculation of Industrial Wastes.

UNIT – IV

Use of Municipal waste water in Industries – Advanced water treatment - Adsorption, Reverse Osmosis, Ion Exchange, Ultra filtration, Defluoridation, Removal of Iron and Manganese, Removal of Colour and Odour.

UNIT – V

Manufacturing Process and origin of liquid waste from Textiles, Paper and Pulp industries, Thermal Power Plants and Special Characteristics, Effects and treatment methods.

UNIT – VI

Manufacturing Process and origin of liquid waste from Fertilizers, Distillers Dairy and Food Processing industries, Special Characteristics, Effects and treatment methods.

UNIT – VII

Manufacturing Process and origin of liquid waste from Suger Mills, Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods.

UNIT – VIII

Common Effluent Treatment Plants – Advantages and Suitability, Limitations, Effluent Disposal Methods.

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TEXT BOOK:

1. Waste Water Treatment by M.N. Rao and A.K. Dutta, Oxford & IBH, New Delhi.

REFERENCE BOOKS:

1. Liquid waste of Industry by Nemerow.
2. Water and Waste Water Technology by Mark J. Hammer and Mark J. Hammer (Jr).

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