### Course Structure for M. Tech. (Environmental Engineering & Studies)
(w.e.f. Academic Year July 2015)

#### Semester I

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**Total**: 18 2 6 41 26 750

*MS = Mid Semester, ES = End Semester, IA = Internal assessment (like quiz, assignments etc), LW = Laboratory work, LE = Lab Exam*

**Elective I:**
- EN 506 Atmospheric Processes and Climate Change
- CE 514T Geographical Information Systems
- EN 508 Environmental Risk Assessment and Management
- EN 509 Environmental Economics and Socio-economic Planning

1
MA 503T ADVANCED NUMERICAL TECHNIQUES AND COMPUTER PROGRAMMING

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UNIT I [12 hours]

UNIT II [10 hours]
Concept of Rate of Convergence; Numerical solution of Algebraic & Transcendental Equations: Introduction, Descarte’s Sign rule, Newton-Raphson method, it’s applications, Solution of non linear simultaneous equations, Newton-Raphson method for multiple roots, Horner’s method, Lin-Bairstow’s method or Method for Complex Root, Graeffe’s root squaring method, Comparison of various methods.

UNIT III [10 hours]

UNIT IV [10 hours]
Curve Fitting: Principle of Least Squares, Fitting a Straight line and other Curves for a given set of data point . Solution of Simultaneous Algebraic Equations: Direct methods, Iterative methods: Gauss-Jacobi’s method, Gauss-Seidal method, Relaxation method.
TEXT/REFERENCE BOOKS:

EN 501T ENVIRONMENTAL CHEMISTRY AND MICROBIOLOGY

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UNIT I [10 hours]

UNIT II [10 hours]
Concepts of Equilibrium Chemistry: Le Chatlier’s principle, Factor influencing equilibrium: Activity, Coefficient: Variations of the equilibrium relationship, Oxidation Reduction reactions, Gas laws, acids and bases, buffers, solubility of salts, Lamnier Index, Lime soda process, degradation chemistry of food products, detergents, pesticides and hydrocarbons

UNIT III [12 hours]
Fundamentals of Microbiology: Prokaryotic, eukaryotic nucleic acids, Nutrition and growth conditions, Effect of environmental conditions, bacterial growth in terms of numbers and mass, growth curve, interpretation of curve, substrate limited growth, Monod's expression, substrate utilization and cell growth, effect of endogeneous metabolism, inhibition, effect of temperature, culturing of microorganisms, application of growth and substrate removal kinetics to biological treatment

UNIT IV [10 hours]
Distribution of microorganisms, indicator organisms, staining, coliforms - fecal coliforms, E.coli, Streptococcus fecalis, differentiation of coliforms, significance, MPN index, Aerobic, anaerobic and facultative, M.F. technique, standards, Microbiology of wastewater treatment processes such as activated sludge process, trickling filter, anaerobic processes. Introduction to Microbiology of Soil and Air and Industrial Microbiology, Introduction to algae for treatment of wastewater, Microbiology of bioremediation and solid waste treatment

[Total 42 hrs]

TEXT/REFERENCE BOOKS:


## EN 501P ENVIRONMENTAL CHEMISTRY AND MICROBIOLOGY

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1. Determination of pH, TDS, EC
2. Determination of Turbidity
3. Determination of Alkalinity and Acidity
4. Determination of chlorides
5. Determination of total hardness and calcium hardness
6. Determination of sulphates
7. Determination of fluoride and nitrates
8. Determination of dissolved oxygen
9. Determination of coagulant dosage by jar test
10. Determination of BOD
11. Determination of COD
12. Determination of residual chlorine
13. Preparation of media and inoculation and Identification of microbes by staining
14. Test for plate count, coliforms, fecal coliforms, E. coli, S. fecalis, M.P.N. and M.F. techniques.

[Total 28 hrs]

## TEXT/REFERENCE BOOKS:

## EN 502 AIR POLLUTION MODELLING, MONITORING AND CONTROL

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### UNIT I
10 hours
Air pollutants, classification of air pollutants, properties of gaseous and particulate matter, effects of Air pollution on plants, animals, human health, Sources of Air pollution and emission inventory, Sampling and Analysis: Ambient air sampling, stack sampling, Air quality standards

### UNIT II
12 hours
Air pollution meteorology: Atmospheric energy balance, environmental lapse rates and atmospheric stability, winds, wind profiles, plume behaviour, convective current, turbulence, Dispersion of Air pollutants, Prediction of effective stack height - physics of plume rise, Holland's equation, Briggs equation, modifications of Gaussian dispersion models

### UNIT III
12 hours
Air quality monitoring, instrument, sampling frequency, sampling network design, Introduction to various air quality models – steady state, dynamic, continuous, discrete and empirical.

### UNIT IV
08 hours
Air pollution control devices, Air sampling and analysis, theory and equipment ambient and Stack sampling, monitoring of quality emission standards and Indoor air pollution, Control of Particulate matter: Dusts, fumes, smoke, samples, settling chambers, cyclones, spray towers, electrostatic precipitators, etc.

### TEXT/REFERENCE BOOKS:
## EN 503 WATER TREATMENT AND SUPPLY SYSTEMS

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**UNIT I**

[08 hours]

Sources of water, Quantity of Water: Design period and population forecast, Water quality: Criteria for different impurities in water for potable and non-potable use

**UNIT II**

[12 hours]

Conventional water treatment: Screens, Types of settling and settling tests, Design of Sedimentation Tank, Coagulation: mechanisms of coagulation, Mixing and Flocculation, Design of clariflocculator, Filtration: Slows sand filters, rapid sand filters and dual layer filtration, Aeration: Concepts, limitations of aeration, types of aerators, Disinfection mechanism and it’s different agents

**UNIT III**

[08 hours]

Specific Treatment: Water Softening, Ion Exchange, Electrodialysis, Membrane Technology: ultra filtration, nano filtration, Reverse Osmosis, Desalination, Defluoridation, Demineralization, Removal of colour, odour and heavy metals

**UNIT IV**

[14 hours]

Intakes, type of intake, conveyance of water, different type of pipes used in water supply, pipe-joint, laying of pipe, hydrostatic test, Type of distribution system, different layout of distribution system, methods of supplying water, pressures in distribution system, distribution resources and its capacity, type of reservoirs & accessories, design of distribution system, design of pipelines and analysis of complex pipe networks-Hard cross method, Valves and Fittings, Plant Hydraulics

[Total 42 hrs]

**TEXT/REFERENCE BOOKS:**

2. Peavy, Rowe & Tehobanoglous, Environmental Engineering, McGraw Hill.
## EN 504 ENVIRONMENTAL LEGISLATION

### Teaching Scheme

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### UNIT I

[07 hours]

Key Institutions responsible for the formulation and enforcement of environmental acts and rules in India. Role of Ministry of Environment, Forests & Climate Change, Central Pollution Control Board, State Pollution Control Board, Municipal Corporations.

### Unit II

[07 hours]


### UNIT III

[07 hours]


### UNIT IV

[07 hours]

General and Industry specific Indian environmental standards for stack emission, industrial waste water discharge, ambient air quality, noise levels, work zone air quality and sewage water. Comparison of environmental standards of India, US-EPA & European Union. EMS and IS14001, IS9000

[Total 28 hrs]

### TEXT/REFERENCE BOOKS:

2. CPCB, “Pollution Control acts, Rules and Notifications issued there under “Pollution Control Series – PCL/2/1992, Central Pollution Control Board, Delhi, 1997.
4. Constitution of India [ Referred articles from part-III, part-IV and part-IV A]
5. P. K. Goel and K. P. Sharma, “Environmental guidelines and standards in India”, Technoscience


9. Commentaries on Water & Air Pollution Laws by M C Mehta, Delhi Law House
Laboratory preparation of reagents with different normality and molarity - Preparation of exothermic and endothermic reagents. Solids- types of solids and its significance, different biological and chemical oxidizers, Carbonaceous BOD – nitrogenous BOD, Soluble BOD, Total BOD and its significance, Chemical Oxygen Demand and importance of BOD/COD ratio with respect to treatment of wastewater, deoxygenation rate and reoxygenation rate and its importance in self purification of streams, Sampling and analysis of ambient, importance of particular matter analysis and chemical compounds and hydrocarbons.

1. Determination of chlorine dosage by break point chlorination
2. Determination of deoxygenation constant and reoxygenation constant
3. Determination of total solids, suspended and dissolved solids, volatile and fixed solids.
4. Determination of settleability of solids
5. Determination of sludge volume index
6. Determination of MLSS and MLVSS in Activated Sludge Process
7. Color and heavy metals removal from wastewater by adsorption and other physiochemical methods.
8. Estimation of suspended particulate matter
9. Estimation of SO₂, NO₂.
10. Determination of Ozone, Lead, Carbon monoxide, Ammonia, Arsenic, Nickel
11. Determination indoor air quality
12. Soil Analysis: pH, Conductivity, TDS, Cation exchange capacity of soil, Sodium Adsorption ratio of soil

[Total 42 hrs]

TEXT/REFERENCE BOOKS:

EN 506 ATMOSPHERIC PROCESSES AND CLIMATE CHANGE

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UNIT I
[10 hours]

UNIT II
[12 hours]
General Meteorology: Thermodynamics of dry and moist air: atmospheric stability and dry adiabatic lapse rate, saturated adiabatic lapse rate, pseudo adiabatic processes and equivalent potential temperature Clausius-Clapeyron (C-C) equation. Micrometeorology: Atmospheric fluid mechanics, turbulence, surface roughness and convective boundary layer.

UNIT III
[08 hours]
Satellite Meteorology: Introduction to satellite meteorology, weather satellite and orbits, satellite images, satellite winds, Data acquisition, data processing and applications, monitoring the global environment.

UNIT IV
[12 hours]
Climate Change: Elements of weather and climate modeling, Basic equation and dynamics of atmosphere, Climate variability and climate change, Global warming and climate change. Elementary idea of Global climate models, Comparison of various IPCC reports, important findings of IPCC AR5, Impacts of climate change – Global and India.

[Total 42 hrs]

TEXT/REFERENCE BOOKS:
10. IPCC reports (http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml)
## CE 514T GEOGRAPHICAL INFORMATION SYSTEMS

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### UNIT I

### UNIT II
EMR Interaction with Atmosphere And Earth Materials: Atmosphere characteristics, Scattering of EMR, Raleigh, Mie, Non Selective and Raman Scattering, EMR Interaction with water vapour and ozone, Atmosphere Windows, Significance of Atmospheric Windows, EMR interaction with earth surface Materials, Radiance, Irradiance, Incident, Reflected, Absorbed and Transmitted Energy, Reflectance, Specular and Diffuse Reflection Surfaces, Spectral Signature, Spectral Signature curves, EMR interaction with water, soil, and Earth surface

### UNIT III

### UNIT IV
Geographic Information System: GIS, Components of GIS, Hardware, Software and Organization Context, Data, Spatial and Non Spatial, Maps, Types of Maps, Projection, Types of Projection, Data Input, Digitizer, Scanner, Editing, Raster and Vector data structures, Comparison of Raster and Vector Date structure, Analysis using raster and Vector Data, Retrieval, Reclassification, Overlaying, Buffering, Data Output, Printers and Plotters

[Total 42 hrs]
TEXT/REFERENCE BOOKS:

EN 508 ENVIRONMENTAL RISK ASSESSMENT AND MANAGEMENT

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UNIT I [10 hours]
Introduction: Sources of Environmental hazards, Environmental and ecological risks, Environmental risk assessment framework, Regulatory perspectives and requirements, Risk Analysis and Management and historical perspective; Social benefit Vs technological risks; Path to risk analysis; Perception of risk, risk assessment in different disciplines.

UNIT II [10 hours]
Elements of Environmental Risk Assessment: Hazard identification and accounting, Fate and behaviour of toxics and persistent substances in the environment, Properties, processes and parameters that control fate and transport of contaminants, Receptor exposure to Environmental Contaminants, Dose Response Evaluation, Exposure Assessment, Exposure Factors, Slope Factors, Dose Response calculations and Dose Conversion Factors, Risk Characterization and consequence determination, Vulnerability assessment, Uncertainty analysis

UNIT III [10 hours]
Different Analysis for Risk Assessment: Cause failure analysis, Event tree and fault tree modelling and analysis, Multimedia and multipath way exposure modelling of contaminant migration for estimation of contaminant concentrations in air, water, soils, vegetation and animal products, Estimation of carcinogenic and non carcinogenic risks to human health

UNIT IV [12 hours]

[Total 42 hrs]
TEXT/REFERENCE BOOKS:

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UNIT I & II


UNIT III & IV

*Socio-economic Planning:* Importance of Socio-economic development planning. Social indicators and their importance, Social impacts of industrial and developmental activities, Quality of life concept- and its use in development planning, Social surveys and socio-economic data generation. Social cost of environmental pollution, Rehabilitation and resettlement of project affected people. Laws related to social development. Corporate Social Responsibility (CSR), different models; Social Accountability (SA) 8000; Certification

[Total 42 hrs]

TEXT/REFERENCE BOOKS:

**Course Structure for M. Tech. (Environmental Engineering & Studies)**
*(w.e.f. Academic Year July 2015)*

**Semester II**

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**Elective II:**
- EN 515 Occupational Health & Safety
- EN 516 Ground Flow and Contaminant transport through Porous Media
- EN 517 Sustainable Sanitation and Water Management

**Elective III:**
- EN 518 Carbon Sequestration and Clean Development Mechanism
- EN 519 Environmental Modelling
- EN 520 Energy Conversion and Environment
EN 510 SOLID AND HAZARDOUS WASTE MANAGEMENT

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UNIT I [10 hours]
Types and Sources of solid wastes: Need for solid, hazardous and bio-medical waste management, Legislations on management and handling of municipal solid wastes, hazardous wastes and biomedical wastes. Waste generation rates, Composition, Hazardous Characteristics, TCLP tests, Waste sampling, Source reduction of wastes, Recycling and reuse.

UNIT II [12 hours]

UNIT III [10 hours]
Disposal in landfills: site selection, design and operation of sanitary landfills, secure landfills and landfill bioreactors, Leachate and landfill gas management, Landfill closure and environmental monitoring, landfill remediation, Elements of integrated waste management

UNIT IV [10 hours]

TEXT/REFERENCE BOOKS:
3. Manual on Municipal solid Waste Management, CPHEEO, Govt. of India.
UNIT I
Introduction to wastewater characteristics, Reactors and reactor analysis: Types of reactors and their analysis, Preliminary Treatment: Screening, Grit removal; Primary Treatment: Primary sedimentation Physical Unit operations, High rate clarification, Oxygen transfer, flotation, Aeration systems

UNIT II

UNIT III
Tertiary Treatment: purpose of tertiary treatment, Disinfection: chlorine, Chlorine Dioxide, Ozone, Ultraviolet Radiation, Treatment, Reuse and Disposal of solids and biosolids, Biological Nutrients Removal Processes: Nutrients in domestic wastewater, Objectives of Nutrients removal, Biological Nitrogen Removal processes (BNR), Biological Phosphorus Removal (BPR)

UNIT IV
Advanced Treatment Process: Electro-oxidation, Fenton, Electro Fenton, Electro-coagulation, wetland treatment, approach to combined physico-chemical and biological, approach to Decentralized wastewater systems, waste disposal systems

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<td>Wastewater Reuse And Residual Management: Individual and Common Effluent Treatment Plants, Joint treatment of industrial and domestic wastewater, Zero effluent discharge systems, Quality requirements for Wastewater reuse, Industrial reuse, Present status and issues, Disposal on water and land, Residuals of industrial wastewater treatment, Quantification and characteristics of Sludge Thickening, digestion, conditioning, dewatering and disposal of sludge, Management of RO rejects, wasteland reclamation techniques.</td>
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<td>Environmental audit: Environmental audit, objectives, types, features, planning of audits, Organisation of Auditing Programme, pre-visit data collection, Audit Protocol, Onsite Audit; Data Sampling, Inspections, Evaluation and presentation; Exit Interview; Audit Report Action Plan, Management of Audits, Waste Management Contractor Audits, Life Cycle Approach.)</td>
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**TEXT/REFERENCE BOOKS:**

2. Eckenfelder. Industrial Water Pollution Control, McGraw-Hill, 2000
### EN 513 ENVIRONMENTAL IMPACT ASSESSMENT

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**UNIT I** [10 hours]

Evolution of EIA: Concepts, Methodologies, Screening, Scoping, Base line studies, Mitigation, Matrices, Check list. Methods for impact assessment: Background information, interaction matrix methodologies, network methodologies, environmental setting various factors, environmental impact assessment methodology, documentation and selection process, environmental indices and indicators for describing affected environment, Life cycle assessment.

**UNIT II** [10 hours]

Prediction and assessment of impact for air and noise environment: Basic information of air quality, identification of type and quantity of air pollutant, existing air quality and air quality standards, impact prediction and assessment, mitigation. Basic information of noise, existing noise levels and standards, prediction of noise levels and assessment of impact, mitigations

**UNIT III** [10 hours]

Prediction and assessment of impact for water and soil environment: Basic information of water quality (Surface water and ground water), water quality standards, identification of impact, prediction of impact and assessment, mitigations. Background information of soil environment, soil and ground water standards, prediction and assessment of impact for ground water and soil, mitigations.

**UNIT IV** [12 hours]

Prediction and assessment of impact on cultural and socioeconomic environment: Basic information on cultural resources and socioeconomic environment, rules and regulations for cultural resources like archaeological, historical structures, Cultural system, prediction and assessment of impact, mitigations. EIA notification by Ministry of Environment and Forest (Govt. of India): Provisions in the EIA notification, Rapid and Comprehensive EIA, general structures of EIA document, Environmental management plan, post environmental monitoring. Case studies in EIA [Total 42 hrs]

**TEXT/REFERENCE BOOKS:**

### EN 514 ADVANCED ENVIRONMENTAL SIMULATION LABORATORY

#### Teaching Scheme

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1. Design of storm water drainage
2. Design of sewer system
3. Design of water treatment plant
4. Design of wastewater treatment plant
5. Noise monitoring, modelling and mapping
6. Air quality monitoring, modelling and mapping
7. Ground water pollutant movement modelling
8. Pollutant dispersion in Lake, river and sea
## EN 515 OCCUPATIONAL HEALTH & SAFETY

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### UNIT I  [10 hours]
Dimensions of environmental health, causative agents of diseases, social factors, urban problems, housing and health, economy and health, climate and other atmospheric elements, violence, crime and mental health, family health practice, health care planning and delivery, chronic and communicable diseases.

### UNIT II  [12 hours]
Industrial and agricultural pollutants, occupational health, epidemiological data, occupational health hazards, environmental exposure and diseases, industrial toxicants, hazardous wastes, preventing exposure to unhealthy and unsafe working conditions, ergonomics, controlling stress of life. Disease control, disease prevention, morbidity and mortality, diseases and progressive deterioration, controlling diseases and disability. Foodborne and waterborne diseases outbreaks, Nuclear energy and environmental health, concerns and uncertainties about nuclear power, nuclear power plants, safety.

### UNIT III  [10 hours]

### UNIT IV  [10 hours]
Different types of fire alarms / detectors & extinguishers, fire fighting requirements as per NBC 1983 / Municipality water supply requirements for fire, required fire flow, storage. Wet risers, sprinkler, fire fighting services, Protection & prevention measures of accidents & hazards Transportation & storage of chemicals, leakage & accident prevention .Industrial risk & Disaster management Survey of two industries for disaster / safety control systems, Electrical Safety Programme pollution control Practices in pesticides Industries  [Total 42 hrs]

### TEXT/REFERENCE BOOKS:

3. National Safety Council Publication
5. CPCB Green Book
UNIT I  
Occurrence of ground water, geological formations as aquifers; types of aquifers, ground water movement, Darcy’s law, permeability and its measurement, tracing of ground water movement, fundamental equations for steady and unsteady ground water flow, flow nets.

UNIT II  
Infiltration galleries, Ground-water replenishment, recharge of ground water, different methods. Groundwater modeling techniques: porous media models, analog models, electric analog models, digital computer models

UNIT III  
Well hydraulics: Steady and unsteady flow in confined, semi-confined and unconfined aquifers, radial flow, superposition; multiple well system, Wells near aquifer boundaries, Different methods of well construction; construction of well casings and screens, natural and artificial gravel packed wells.

UNIT IV  
Salt water intrusion: Concept; interface and its location; control of intrusion. Pollutant transport: Plume Transport, source identification, tracer methods and control measures.

TEXT/REFERENCE BOOKS:
1. Todd, D K Groundwater Hydrology , John Wiley publishers , 2004
4. Raghunath, Groundwater & Well Hydraulics, Wiley Eastern Ltd, New Delhi, 1992
EN 517 SUSTAINABLE SANITATION AND WATER MANAGEMENT

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UNIT I [10 hours]
Introduction: Concept of sustainability in sanitation and water management, water cycle, nutrient cycle, integrated water resource management, Sustainable Sanitation, Linking up Sustainable Sanitation and Water Management

UNIT II [10 hours]
Natural Wastewater Treatment Systems: Natural and constructed wetlands, different types, Mechanisms, performance, design, case studies, Land treatment systems, Centralised and Decentralised Systems for Water and Sanitation

UNIT III [11 hours]
Low-cost sanitation: Dry sanitation methods, Pit latrines, VIP latrines, Aquaprivy, septic tank, Ecological Sanitation, Socio-Economic Aspects of sanitation

UNIT IV [11 hours]
Water Conservation Rainwater Harvesting: Roof water harvesting, technology, quality, heath issues, Groundwater recharge, techniques, case studies Wastewater reuse and reclamation

[Total 42 hrs]

TEXT/REFERENCE BOOKS:

3. The World Bank – Appropriate technology for water supply and sanitation. (Series)
### EN 518 CARBON SEQUESTRATION AND CLEAN DEVELOPMENT MECHANISM

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**UNIT I**

[10 hours]


**UNIT II**

[10 hours]


**UNIT III**

[12 hours]


**UNIT IV**

[10 hours]

Emissions trading of CDM: Difficulties with the CDM, Financial issues with the CDM, prototype carbon funds (PCF), Carbon Credits and it's trading, carbon finance, and evaluation of Carbon Credit of solar energy systems. Emissions trading under different article, Carbon foot prints

**TEXT/REFERENCE BOOKS:**

[Total 42 hrs]

1. Cites Carbon Capture: Sequestration and Storage (Issues in Environmental Science and Technology), by R E Hester and R M Harrison.
3. Climate Change and the Kyoto Protocol: The Role of Institutions and Instruments to Control Global Change by Michael Faure Joyeeta Gupta Andries and Nentjes.
# EN 519 ENVIRONMENTAL MODELLING

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**UNIT I**  
10 hours  
Introduction: Mathematical modelling and simulation, Defining systems and its components, Types of models and their applications.

**UNIT II**  
12 hours  

**UNIT III**  
10 hours  
Introduction to Soft Computing Techniques Fuzzy set theory and logic, Fuzzy MCDM and FRBS, simple applications in environmental engineering. Neural networks and Genetic algorithms

**UNIT IV**  
10 hours  
GIS Applications in Environmental Engineering, introduction to GIS, concepts and data base structure, introduction to GIS software; Introduction to Remote Sensing; Applications in Environmental Engineering

**TEXT/REFERENCE BOOKS:**

4. International Water Association - Activated sludge modelling ASM1 and ASM2
EN 520 ENERGY CONVERSION AND ENVIRONMENT

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UNIT I

Interlinkages of energy and environment: Principles of energy conversion methods: thermal, nuclear, hydro, solar.

UNIT II

An introduction to fuels, combustion fundamentals, thermodynamics, kinetics and properties of combustion products; combustion principles for gases, liquids and solids; Formation of pollutants, measurements and control

UNIT III

Automobile engines, operation and design, emissions, power production and emissions from waste incineration, Energy policies, economics related to energy along with cost factor, the renewable energy sources and conversion processes and sustainable energy

UNIT IV

Energy externalities, Energy and climate change global issues; Alternative energy sources, economics, sustainability

TEXT/REFERENCE BOOKS:

CE 527T SUCCESSFUL RESEARCH PROGRAM DEVELOPMENT

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Unit I [08 hrs]

Unit II [06 hrs]

Unit III [06 hrs]

Unit IV [08 hrs]
### Course Structure for M. Tech. (Environmental Engineering & Studies)
(w.e.f. Academic Year July 2015)

#### Semester III

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SEMINAR I/II

Each student is required to make a seminar presentation on any chosen topic connected with the field of specialization. In the seminar it is intended that the student presents the state-of-the-art published information along with the potential research gaps. The seminar shall be evaluated by a Department Committee constituted for this purpose, based on a report submitted by the candidate and a viva-voce conducted at the end of the semester.

INDUSTRIAL TRAINING

The intention of this training is to develop the intuitive skills of the candidate and to expose them with real time problems faced in the industry. The candidates may undergo industrial training instead of taking the directed study. The training shall be at least for 6 weeks duration (After completion of 2nd Semester) to be done during the summer vacation. The candidate is required to identify a real time problem in the industry and come up with the possible solution or the strength and weakness of an industry and the methods to minimise the weakness.

DISSERTATION

Each student is to carry out the dissertation work for which topic will be assigned at the end of the second semester. The main objective of dissertation work is to provide scope for original and independent study/research, to develop a theme and to demonstrate ability of using analytical approach independently. The theme or topic of dissertation should be within the framework of P.G. Programme. Thesis is prepared by each student under the supervision of the faculty advisor and to be submitted as per the specified time and the student has to defend his/her work at the viva-voce examination fixed by the Institute.