

MTEE 201-WATER TREATMENT –II

- UNIT –I :** **Disinfection Processes :**Mode of Disinfection, Theories and rate of disinfection effect of different parameter on disinfection efficiency, Different methods of disinfection .
- UNIT-II :** **Adsorption Processes :** Cause and type of adsorption, Adsorption equilibrium and Isotherms, Rate limiting step, Factors influencing adsorption of mixing solute, Nature of Adsorbent, Batch and continuous system, Designing of mixed bed absorber.
- UNIT –III :** **Membrane Process :** Separation Process and principle driving forces of Separation of different processes, Reverse osmosis, Osmotic presser, Water and solute Diffusion, Properties of cellulose acetate membrane, Feed temperature and pH effect on Processes, Solute rejection, System design and application, Ultra-filtration, Concentration Polarization application, Electro-dialysis, Desalination.
- UNIT- IV :** **Aeration and Gas Transfer :**Gas transfer process, Rate of gas transfer, Aeration And gas transfer system, Factor affecting oxygen transfer rate, Transfer correlation.
- UNIT –V:** **Advance Water Treatment :** Advance method of water treatment, Alkaline water, Ionized water, Hexagonal water, Ionizer Ozonation.

Reference Book

1. Physiochemical Processes for treatment of water by-WJ Weber
2. Environmental Engineering by- H,S.Peary, UR, Rowe & G.Tehobanoglous
3. Municipal Water Supply and Treatment published by CPHEEO, Ministry of Urban Development
4. Water supply & Sewerage by - Ernst Wested

MTEE 202 - WASTE WATER TREATMENT – II

- UNIT –I:** Biological Unit Process: Role of Micro-organisms, Bacterial growth and Biological oxidation, Kinetics of biological growth, Techniques for evaluation of kinetic and stoichiometric parameter, Aerobic & anaerobic suspended-growth treatment processes, Aerobic & attached growth treatment processes.
- UNIT-II:** Design of Biological Treatment units of Wastewater: Attached growth reactors (process description design and applications), Aerated lagoon treatment, Trickling-Filter (Aerated attached-growth) treatment, and stabilization pond.
- UNIT-III:** Design of the Treatment and Disposal of sludge: components of anaerobic reactions that influence process design, sludge sources, characteristics and quantities, preliminary operations concentrations, Thickening stabilization chemical and thermal processes, Stabilization: Anaerobic sludge digestion process, sludge conditioning, Dewatering, Heat Drying Composting.
- UNIT-IV:** Different Advanced Waste Water Treatment: Concepts and principles of carbon oxidation, chemical constituents in wastewater, Nitrogen conversion and removal, Nitrification, Nitrogen Removal of refractory organisms. De-nitrification methanogenesis.

Reference Books:

1. Waste Water Engineering Treatment & Reuses By- Metcalf & Eddy (Tata Mc-Graw Hill)
2. Water & Wastewater technology by Mark J. Hammer (Prentice-Hall of India)
3. Manual on Sewerage & sewage Treatment By CPHEEO, Ministry of urban Dev. New Delhi
4. Waste water Treatment for pollution Control by Soli J Arceiwala

MTEE 203 - INDUSTRIAL WATER AND WASTE WATER TREATMENT

- UNIT-I :** **Introduction to water conditioning:** Processes, Production water, Boiler feed water, Internal Treatment of boiler feed water, Control of hardness, Conditioning of Precipitate Corrosion Control, Control of carry over , Blow down in boiler, External treatment of water , Ionic Strength of water, langelier index ,Ryzner index, Saturation Index.
- UNIT-II:** **Water conditioning process:** Lime soda process, hotline soda process, Hot Phosphate process, water conditioning by Equilibrium diagram use of Lawrence-Caldwell Diagram, Ion-Exchange process, Cooling water an it's treatment.
- UNIT-III:** **Preliminary treatment of industrial waste water :** Volume Reduction, Strength reduction, Neutralization, Equalization and prepositioning, Removal of suspended solid, removal of colloidal solids, Removal of inorganic dissolved solids.
- UNIT-IV:** **Joint treatment:** Joint treatment of Raw industrial waste water with domestic sewage, Site selection of plant, solid waste from industries.
- UNIT-V:** **Origin, characteristics and treatment of waste water:** From sugar tannery, textile, Brewery, Distillery, Pharmaceutical, Metal Plating, Pulp and Paper industries.

REFERENCE BOOKS:-

1. "Liquid waste of industries", (Theories, practices and treatment) By Nelson L. Nemerow (Addison-Wesley Pub Co.)
2. "Managing Industrial Pollution" By S.C. Bhatia (Mc-millan India Ltd)

MTEE 204 - ENVIRONMENTAL IMPACT ASSESSMENT AND AUDIT

Environmental Impact Assessment

Planning and Management of Environmental Impact Studies. Impact identification methodologies: base line studies, screening, scoping, checklist, networks, overlays. Prediction and assessment of impacts on the socioeconomic environment. Environmental cost benefit analysis. Decision methods for evaluation of alternatives. Case Studies. Environmental impact assessment at project level, regional level, sectoral level, and policy level.

Sustainable development; Environmental policy in planned, mixed and market economies. Preventive environmental management.

Guidelines for Environmental Audit :Concepts and definitions of Environmental Audit, Audit objectives , Scope, Types of Audit, Need for Environmental Audit , Application.

Key steps to Environmental Audit: Pre , Onsite & Post Environment audit activities. Audit Procedure, Format of Environmental Audit.

References:

- 1 Environmental Impact Assessment- Larry W. Canter, University of Oklahoma- McGraw Hill Company
2. Environment Impact Assessment, Clark D. Brain, Biesel Donald
- 3 EIA for Developing Countries, Biswas Asit K.
- 4 Environment Impact Assessment, W. Canter (II Edition)
- 5 EIA Guidelines 1994, Notification of Govt. of India Impact Assessment Methodologies Publications Ltd. (1995)
6. Guidelines for environmental audit. By Central Pollution Control Board. DELHI, Place and Publisher: Delhi : CPCB
7. Environmental audit and business strategy: Total quality approach by G. Ledgerwood, TERI
8. A-Z organization of environmental audit by A. Mehrotra, mpIIFM
9. Environmental audit (an overview), , Ashok Keshav Mhaskar, CSE
10. An outline of environmental audit by K. V. Bengeri, CSE
11. Environmental audit (an overview) by A. K. Mhaskar, CSE
12. Clarck KC Parks, B O, Crane ,MP “Geographic Information Systems and environmental Modeling” Prentice Hall of India Pvt Ltd.2002.
13. Reddy, MA “Text book of remote sensing & GIS”, BS publications 2001.

MTEE 205 - AIR POLLUTION & CONTROL

- Unit – I:** **Air pollution problem:** Economics and social aspects, historical episodes of air pollution. Sources of Air pollution, effects of air pollution on health, animal, plants and materials
- Unit – II:** Role of meteorological condition, properties of typical air pollutants, air diffusion and concentration pollutants. general diseases caused by air pollutants. toxicity of various pollutants. Plumes patterns and height of chimneys.
- Unit – III :** Atmospheric chemistry, formation of secondary pollutants – PAN, PBN, Photolytic cycles, general diseases and toxicity of pollutants
- Unit – IV :** **Sampling and Analyzing of Air Pollutants:** Instruments pollution survey, standards of air pollution. Principle of air pollution control, site selection and zoning, various control methods, process and equipment changes, design and operation of various air pollution control equipments.
- Unit – V :** Air pollution control legislation, public education pollution standards, status of air pollution control in various countries.
- Industrial Hygiene:** Concept and importance, factory Involved in environmental hazards, industrial ventilation occupational diseases, control methods.

Reference Books :--

1. "Air Pollution" - Faith W.L, John Wiley & Sons
2. "Air Pollution" - McCabe L.C., McGraw Hill, International
3. Air Pollution - Stern A.C., Academic Press N. York
4. Fundamentals of Air Pollutions - Raju BSN Oxford & IBH Publishing Co. Pvt. Ltd.
5. "Air Pollution" - Rao M.N. & Rao HVN - Tata McGraw Hill
6. Air Pollution – Wark and Warner

MTEE- 206 ADVANCE ENVIRONMENT LAB-II

The exercises in this component shall be designed to demonstrate the basic principle outline in different units of the theory paper . After completing the exercises the student should have developed a good grasp of the practical utilities of the theory contents.

(Suggestion: Experiments related to Air Quality Monitoring and Waste Management)

MTEE 207 FIELD TESTING LAB –II

The exercises in this component shall be designed to demonstrate the basic principle outline in different units of the theory paper . After completing the exercises the student should have developed a good grasp of the practical utilities of the theory contents.