

19CE213

ENVIRONMENTAL ENGINEERING

Hours Per Week :

L	T	P	C
2	-	2	3

Total Hours :

L	T	P	WA/RA	SSH/HSH	CS	SA	S	BS
30	-	30	20	48	6	12	3	5



Source :https://ocw.mit.edu/courses/civil-and-environmental-engineering/dhp_1.jpg

COURSE DESCRIPTION AND OBJECTIVES:

The main objective of this course is to make the student aware of basic ideas of algorithms and programming. Basic Programming should be used to solve problems related to Structural Engineering, Water resource Engineering, Environmental Engineering, Geo-technical Engineering and Geology

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Describe water quality parameters and treatment techniques	1
2	Examine sewage quality parameters and treatment techniques.	1
3	Summarize the basic concepts of air and noise pollution	1
4	Discuss the solid waste management and disposal techniques	1
5	Discuss the various plumbing techniques	1

SKILLS:

- ✓ Evaluate the contamination level of water bodies.
- ✓ Design a filter medium.
- ✓ Design of Water softening models.
- ✓ Prepare, review, and update environmental investigation and recommendation reports.
- ✓ Design a water distribution system for a given city.

- UNIT-I** **L-9**
- WATER:-**Sources of Water and quality issues, water quality requirement for different beneficial uses, Water quality standards, water quality indices, water safety plans, Water Supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design.
- WATER TREATMENT:** aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes
- UNIT-II** **L-9**
- SEWAGE-**Domestic and Storm water, Quantity of Sewage, Sewage flow variations. Conveyance of sewage- Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems - Small bore systems, Storm Water- Quantification and design of Storm water.
- WASTEWATER MANAGEMENT** - Sewage and Sullage, Pollution due to improper disposal of sewage, National River cleaning plans, Wastewater treatment, aerobic and anaerobic treatment systems, suspended and attached growth systems, recycling of sewage – quality requirements for various purposes.
- UNIT-III** **L-9**
- AIR** - Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air pollution- Occupational hazards, Urban air pollution automobile pollution, Chemistry of combustion, Automobile engines, quality of fuel, operating conditions and interrelationship. Air quality standards, Control measures for Air pollution, construction and limitations.
- NOISE-** Basic concept, measurement and various control methods
- UNIT – IV** **L-9**
- SOLID WASTE MANAGEMENT-**Municipal solid waste, Composition and various chemical and physical parameters of MSW, MSW management: Collection, transport, treatment and disposal of MSW. Special MSW: waste from commercial establishments and other urban areas, solid waste from construction activities, biomedical wastes, Effects of solid waste on environment: effects on air, soil, water surface and ground health hazards.
- Disposal of solid waste - segregation, reduction at source, recovery and recycle. Disposal methods- Integrated solid waste management. Hazardous waste: Types and nature of hazardous waste as per the HW Schedules of regulating authorities
- UNIT-V** **L-9**
- BUILDING PLUMBING** - Introduction to various types of house plumbing systems for water supply and waste water disposal, high rise building plumbing, Pressure reducing valves, Break pressure tanks, and Storage tanks.
- Building drainage for high rise buildings, various kinds of fixtures and fittings used. Government authorities and their roles in water supply, sewerage disposal.

LABORATORY EXPERIMENTS

LAB EXPERIMENTS

TOTAL HOURS:30

1. Total suspended and dissolved solids in water / sewage sample.
2. Fixed and volatile solids in water / sewage sample.
3. Settle able Solids.
4. Turbidity of water / sewage sample.
5. pH value of water / sewage sample.
6. Nitrates of water / sewage sample.
7. Sulphates of water / sewage sample.
8. Temporary and permanent hardness of water sample.
9. Chloride concentration of water / sewage sample.
10. Acidity of water sample.
11. Alkalinity of water sample.
12. Fluorides in water sample.
13. Dissolved Oxygen of Water / Sewage Sample
14. Biochemical Oxygen Demand (BOD) of waste water.
15. Chemical Oxygen Demand (COD) of waste water.
16. Noise levels at various places.
17. Bacteriological quality measurement: MPN
18. Ambient Air quality monitoring (TSP, RSPM, SO_x, NO_x)
19. Ambient noise measurement

TEXT BOOKS:

1. Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice Hall, New Jersey.
2. Introduction to Environmental Engineering by P. AarneVesilind, Susan M. Morgan, Thompson /Brooks/Cole; Second Edition2008.

REFERENCES:

1. Manual on Water Supply and Treatment. Ministry of Urban Development, NewDelhi.
2. Plumbing Engineering. Theory, Design and Practice, S.M. Patil,1999
3. Integrated Solid Waste Management, Tchobanoglous, Theissen& Vigil. McGraw Hill Publication
4. Manual on Sewerage and Sewage Treatment Systems, Part A, B and C. Central Public Health and Environmental Engineering Organization, Ministry of Urban Development