

NIRMA UNIVERSITY
Institute of Technology
School of Engineering
Bachelor of Technology - Civil Engineering
Semester- V

L	T	P	C
3	0	2	4

Course Code	2CL502
Course Name	Environmental Engineering

Course Outcomes:

At the end of the course, students will be able to –

1. predict water demand for design of water distribution network
2. assess quality of water and design water treatment system
3. evaluate characteristics of wastewater and design sewerage system
4. illustrate the concepts of solid waste management, air pollution and noise pollution.

Syllabus

Teaching hours: 45

Unit 1: Water Supply System

Hours: 05

Sources of Water, Water supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Population forecasting methods, Components of water supply system.

Unit 2: Water Treatment

Hours: 12

Water quality parameters and their significance in domestic use - Drinking water quality standards, basic unit operations and unit processes for surface water treatment, Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection. Design of different treatment units.

Unit 3: Sewerage System Design

Hours: 06

Physical, Chemical and Biological characteristics of domestic wastewater, Wastewater flow, Sewerage system and sewer design, Effluent discharge standards, Self-purification of natural stream.

Unit 4: Wastewater Treatment

Hours: 12

Wastewater Treatment - Preliminary, Primary and Secondary Treatment Units, Aerobic and Anaerobic processes, Sludge treatment and disposal, Waste water treatment oxidation ditch & other treatment concepts.

Unit 5: Air Pollution

Hours: 04

Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air quality standards, Control measures for air pollution.

Unit 6: Solid Waste Management**Hours: 04**

Quantity, composition and characteristics of solid wastes, classification of solid wastes, planning of solid waste management system; Disposal system.

Unit 7: Noise Pollution**Hours: 02**

Impacts of Noise, Permissible limits of Noise pollution, Measurement of Noise and Control of Noise pollution.

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work will be based on above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings:

1. Birdie, G. S., & Birdie, J. S. *Water Supply and Sanitary Engineering*, Dhanpat Rai Publishing.
2. Garg, S.K.,. *Water Supply Engineering–Environmental Engineering (Vol. I)*. Khanna Publishers.
3. Garg, S.K., *Sewage Disposal and Air Pollution Engineering–Environmental Engineering (Vol. II)*. Khanna Publishers.
4. Peavy H.S., Rowe, D., & Tchobanoglous, G. *Environmental Engineering*, McGraw Hill.
5. Tchobanoglous, G., & Kreith, F. *Handbook of Solid Waste Management*, McGraw Hill.
6. *Manual on Municipal Solid Waste Management*, CPHEEO, Ministry of Urban Development, Government of India.
7. Rao, M.N., & Rao, H.V.N. *Air pollution*, Tata McGraw Hill.
8. Metcalf & Eddy, George Tchobanoglous, F L Burton & H D Stensel, *Wastewater Engineering Treatment and Reuse*, Tata McGraw Hill.

L= Lecture, T= Tutorial, P= Practical, C= Credit

w.e.f. academic year 2020-21 and onwards