

(ELECTIVE – D/I)
4/4 B.Tech. SEVENTH SEMESTER

CE7T5D

ADVANCED ENVIRONMENTAL ENGINEERING

Credits: 3

Lecture: 3 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Objectives:

- To understand how to dispose the waste water to water bodies without polluting them.
- To learn the design concepts of low cost biological treatment units.
- To gain knowledge about the treatment of industrial effluent by knowing the sources and characteristics of the effluents.
- To know the sources, types, effects and the control of air pollutants and noise pollution.

Learning outcomes:

After the exposure to the subject, student knows:

- Different types of air pollutants, their affects and air pollution controlling techniques.
- The causes and effects of key types of air pollution. Appreciate different pollution control strategies
- Basics of noise, sources, effects and how to control the noise pollution

UNIT – I

AIR POLLUTION:

Introduction-impact on environment-Air Pollution – sources of pollution: Classification – effects on human beings – Global effects of Air pollution.

UNIT-II

METEOROLOGY AND PLUME DISPERSION:

Meteorological parameters-maximum mixing depth- plume behavior-air pollution Modeling-Gaussian plume model-plume rise- minimum stack height

UNIT – III

METHODS OF CONTROLLING:

Air pollution Control Methods – Particulate control devices – equipments-settling chambers-fabric filters-electrostatic precipitators.

UNIT-IV

GASEOUS POLLUTANTS:

General Methods of Controlling Gaseous Emission-adsorption-absorption-combustion-condensation-SOXcontrol- NOX control-technologies.

UNIT- V

NOISE POLLUTION:

Introduction: Fundamentals of vibration, vibration of membranes and plates, Acoustic wave equation, Acoustic energy and sound Intensity and Propagation of sound.

UNIT-VI:

NOISE STANDARDS:

Effects of noise and control methods – Effluent standards – Air emission standards –Air Act – Environment Protection Act.

UNIT-VII**RESONATORS AND FILTERS:**

Helmholtz Resonator- Acoustic impedance- Reflection of waves in pipe- Expansion chamber type of filters- Speech, hearing, and noise- Mechanism of hearing- Thresholds of ear - Loudness.

UNIT VIII:**ARCHITECTURAL ACOUSTICS:**

Sound intensity in a Live room, Decay of sound, Measurement of Reverberation time, Sound absorption coefficients, Sound absorbing materials for noise reduction.

Learning resources**Text books:**

1. Environmental Science and Engineering by Henry, G. and Heinke, G.W., J – Person Education, 2011.
2. Hazardous Waste management by LaGrega, M.D, P.L. Buckingham, J.C.Evans, Waveland PressInc, 2010.

Reference books:

1. Environmental Engineering and Management, (2nd Edition) by Suresh,I., S.K.Kartarai and Sons, 2005.
2. Air Pollution and Control by Rao M.N and Rao, H.N., 1985.

Web Reference books: NPTEL