

4. Don Melnick. 2005. Environment and Human Well-being - A Practical Strategy, Earthscan.
5. Lori M. Hunter. 2000. The Environmental Implications of Population Dynamics, Rand Corporation.
6. Nanda, A.N. 1996. Environmental Education.
7. Sharma, P.D. 2012. Ecology and Environment, Rastogi Publications, Meerut.
8. Tyler Miller Jr. G. 1996. Living in the Environment - Principles, Connections and Solutions, Wadsworth Publishing Co., New York.

### **PRACTICAL COURSES** **ESP506 ENVIRONMENTAL BIOLOGYLAB.**

**Course Outcomes:**

*CO1 Conduct experiments to detect the physico-chemical and biological properties of water.*

*CO2 Understand intertidal region and mangrove vegetation.*

*CO3 Enhance the theoretical knowledge of environmental biology with lab experiments and observation of specimens.*

*CO4 Learn algal indices.*

1. Study of microbial flora/planktons found in water/soil samples including pond bottom sediments.
2. Determination of Total alkalinity of different water samples.
3. Estimation of chloride in the water samples.
4. Determination of DO in water sample.
5. Estimation of Nygaard's algal indices in a given water sample.
6. Positive/ Negative staining of bacterial sample.
7. Determination of Total Hardness of different water samples.
8. Microscopic observations of microbes - Keys to identify microorganisms.
9. Practical exercises in identification of symbiotic organisms.
10. Study of aquatic communities – Aquatic plants and animals.
11. Study of intertidal organisms.
12. Study of mangrove vegetation.
13. Study of seaweeds.
14. Identification of bryophytes, ferns and higher plants.

### **ESP507SOLID WASTE MANAGEMENTLAB.**

**Course Outcomes:**

*CO1 Characterize solid waste from different sources.*

*CO2 Conduct the experiments using leachate prepared from solid waste.*

*CO3 Learn compost analysis.*

*CO4 Know the method of determination of chemicals in solid waste.*

*CO5 Learn solid waste management methods.*

1. Characterization of solid waste from different sources.

2. Designing of secured/sanitary landfills.
3. Study of methods of management of biomedical waste.
4. Characterization of toxicity of hazardous waste from different sources by leaching test procedure.
5. Determination of organic carbon in compost.
6. Field trip to municipal solid waste/zero waste management sites/ Biomedical waste plant.
7. Determination of inorganic phosphate in leachate samples.
8. Determination of total nitrogen in leachate.
9. Determination of TSS/TDS in leachate samples.

### **ESP508 AIR, NOISE AND RADIATION POLLUTIONLAB.**

***Course Outcomes:***

*CO1 Assess air pollutants, noise pollution and radiation in different areas.*

*CO2 Learn air pollution indicators.*

*CO3 Assess particulate matters in different areas.*

*CO4 Learn SO<sub>2</sub>, NO<sub>x</sub> analysis.*

1. Determination of SO<sub>2</sub> in different areas.
2. Determination NO<sub>x</sub> by spectrophotometric method.
3. Basic radioactive measurement procedures using GM counter.
4. Studies on indicators of air pollution.
5. Measurement of noise level in different environments by sound level meter (SLM).
6. Determination of particulate matters PM<sub>10</sub> and PM<sub>2.5</sub>.
7. Field visit to assess air and noise pollution.
8. Determination of radiation in a given area using dosimeter.

### **ESP509 ENVIRONMENTAL IMPACT ASSESSMENT LAB.**

***Course Outcomes:***

*CO1 Assess and predict the impact on environmental components.*

*CO2 Prepare model environmental audit report for any industry/process/ operation.*

*CO3 Learn the methodologies of environmental impact assessment and environmental audit.*

*CO4 Understand the impact of urbanization on environment.*

1. Assessment and prediction of impact on air and water.
2. Assessment and prediction of impact on flora and fauna.
3. Criteria for EIA of water related projects.
4. Criteria for transport related EIA.
5. Environmental guidelines for EIA of industrial establishments.
6. Measurement of suspended particulate matter in air.
7. Study on agricultural activities and their impact on environment.
8. Impact on environment due to urbanization.
9. Preparation of model environmental audit report for the financial year ending 31<sup>st</sup> March for any industry/process/operation.