AGT-856	Solid Waste Management	3(3-0)

Outcomes

Upon successful completion of the course, the student will be able to:

- Knowledge about air pollution and air pollutants and their effects on human health.
- Air quality standards in Pakistan, monitoring of air pollution and its mitigation technologies.
- Noise pollution sources and their impacts on human health, noise standards and mitigation of noise pollution.

Contents

Theory

1. **Introduction and Fundamentals**
   a. Sources and type of solid wastes (integrated, municipal-residential, commercial, institutional waste, etc.),
   b. Types, generation rate and composition, climatic and socioeconomic factors affecting these parameters, properties: physical, chemical and biological.
2. **Management of Solid Waste**
   a. Regulatory requirements for management and disposal of waste.
   b. Waste minimization (reduce, recover, reuse and recycle).
   c. Waste storage, handling, collection, transfer, scavenging, transport and disposal.
3. **Disposal of Solid Waste and Waste Incineration**
   a. Safe Disposal and Management Techniques: Composting/biodegradation and its types, incineration and its impacts, immobilization, waste to energy, refuse derived fuel, pyrolysis.
4. **Design and Construction of Landfills**
   a. Landfill types, methods, siting and design considerations,
   b. Landfill as bioreactor, control of landfill leachate & gases, environmental monitoring system for landfills. Landfill closure and use.
5. **Hazardous Waste Management**

a. Sources and nature/characteristics of hazardous waste (industrial, hospital, nuclear)-impact on environment,
b. Biological waste; hospital, pathological, slaughter house, animal/poultry/farmhouse waste.
c. Chemical waste, Industrial, Nuclear, Radioactive, Methods of Disposal of hazardous waste, underground storage tanks construction, installation closure, sea burial, deep rock injection.

Suggested Readings:

1. Frank, K., G. Tchobanoglous. 2002. Handbook of Solid Waste Management, Second Edition, McGraw Hill, New York, USA.
2. Michael, D. L., P. L. Buckingham and C. E. Jeffrey. 2010. Hazardous Waste Management, Waveland Pr In, IL, USA.
3. Worrell, W. A., P.A. Vesilind and C. Ludwig. 2016. Solid Waste Engineering: A Global Perspective Publishing House. Boston, USA.