Waste Management

Course objectives:

- To explore types of waste generated from various sources and their characteristics
- To have adequate knowledge on management of municipal waste
- To understand basic concepts of solid waste management
- To foster practical understanding of Hazardous Waste Management

Module I (8 hours)

Introduction, Classification of Waste, Urban waste (Municipal Solid Waste & Construction &Demolition waste), Industrial waste, Biomedical waste, E –Waste. Hazardous waste and Non- Hazardous waste, solid waste, Sewage &Sludge, Universal Wastes, Mixed Wastes. Characteristic of Waste, Industrial Waste Water, Organic pollution. Industrial waste: Types of industries and industrial pollution – Characteristics of industrial wastes, effects of industrial effluents on streams, sewer, land, sewage treatment plants and human health

Module III

Introduction to municipal waste, Sources and types of municipal Waste, quantity – factors affecting generation of Municipal Waste, characteristics – methods of sampling and characterization, effects of improper disposal of Municipal Waste, public health effects-principle of Municipal Waste management, social & economic aspects- public awareness - role of NGOs- legislation

Module III (8hours)

Management of solid waste: introduction, types of solid wastes, characteristics, and perspectives sources of solid wastes, properties of solid wastes, solid waste management: an overview. Engineering Systems for Solid Waste Management: Solid waste generation; on-site handling, storage and processing; collection of solid wastes; transfer and transport; processing techniques; ultimate disposal; Integrated SW Management concepts.

Module IV (8hours)

Hazardous Waste Management: Introduction; Concern about Hazardous Waste Management; Characteristics of Hazardous Waste; Transportation and Disposal of Hazardous Waste; Industrial/biomedical waste, E- waste management. Global and Indian scenario: Present scenario and measures to improve system for different functional elements of solid waste management system

Course outcomes:

After successfully studying this course, students will able to:

- identify and classify various types of waste generated from the various sources
- appraise different elements of associated with municipal wastes waste management system
- implement solid waste management concepts in real life
- create awareness about hazardous waste and formulate strategies for Hazardous Waste Management

Books:

1. Pichtel John, Waste Management Practices: Municipal, Hazardous, and Industrial. CRC Press, 2nd edition, 2014.
2. Newton D. E. Waste Management: A Reference Handbook. ABC-CLIO, 2020.
3. Ganguly V. B. E-Waste Management: Challenges and Opportunities in India. Routledge India.1st edition, 2021.
4. Cherry P.M. Solid and Hazardous Waste Management. CBS publishers and distributors pvt ltd. 2017.
5. Christensen T.H. Solid Waste Technology & Management, Wiley publication.
6. George T., Hilary T. , Samuel A V., Integrated Solid Waste Management : Engineering principles and management issues, M/c Graw hill Education . Indian edition
7. D. B. Botkin, and E.A. Keller, Environmental Science, 8ed, Wiley
8. Municipal Solid waste management manual, Part II published under Swachh Bharat Mission, Central Public Health and Environmental Engineering Organization (CPHEEO), 2016, Ministry of Urban Development, Government of India.
9. Electronic Waste Management Rules 2016, Govt. of India. https://cpcb.nic.in/ewaste/
10. Michael D. Lagrega, Phillip L. Buckingham and Jeffrey C. Evans., Hazardous Waste Management. 2nd Edition, McGraw Hill International, London, 2010.
11. MSW Management Rules 2016, Govt. of India https://cpcb.nic.in/rules-2/
12. Rules and Regulation of Hazardous substance management", Ministry of Environment, Forest and Climate change, 2015