

## HAZARDOUS WASTE MANAGEMENT

### Module I

Sources of hazardous waste: types and sources hazardous wastes - need for hazardous waste management -elements of integrated hazardous waste management and roles of stakeholders and ngos - salient features of Indian legislations on management and handling of hazardous wastes, biomedical wastes, lead acid batteries, e-waste.

### Module II

Characterization of hazardous waste :hazardous waste generation rates and variation - composition, physical, chemical and biological properties of hazardous wastes - hazardous characteristics – tc1p tests - waste sampling and characterization plan - source reduction of wastes -recycling and reuse.

### Module III

Handling of hazardous waste: handling and segregation of wastes at source - storage and collection hazardous. Wastes -need for transfer and transport - transfer stations optimizing waste. Allocation - compatibility, storage, labelling and handling of hazardous wastes.

### Module IV

Processing of hazardous waste: objectives of waste processing - material separation and processing technologies -biological and chemical conversion technologies - thermal conversion technologies and energy recovery - incineration - solidification and stabilization of hazardous wastes - treatment of biomedical wastes and e-waste. Disposal of hazardous waste: waste disposal options - disposal in landfills - landfill classification- construction and operation of secured landfills -bioreactors - ocean dumping - land disposal – soil remediation.

### REFERENCES

- 1.CPHEEO,"Manual on Municipal Solid waste management", Central Public HealthandEnvironmental Engineering Organisation, Government of India, New Delhi, 2000.
- 2.Micheael D. LaGrega, Philip L Buckingham, Jeffrey C. E vans and "Environmental Resources Management", Hazardous waste Management, McGraw-Hill International edition, New York, 2001.
- 3.Vesilind P.A., Worrell W and Reinhart, "Solid waste engineering", Thomson Learning Inc., Singapore, 2002.