INTEGRATED WASTE MANAGEMENT FOR A SMART CITY (Open Elective-I)

Course Code: 20CE11L6

Pre-requisites: Environmental science

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Describe current issues in solid waste and status in first 20 cities

CO2: Apply fundamentals of municipal solid waste management

CO3: Apply various disposal methods of solid waste

CO4: Explain management of construction and demolition waste

CO5: Explain management of electronic waste

UNIT-I

INTRODUCTION TO SOLID WASTE MANAGEMENT:

Municipal Solid Waste Sources; composition; generation rates Swachh Bharat Mission and Smart Cities Program, Current Issues in Solid Waste Management and Review of MSW Management Status in First List of 20 Smart Cities in the Country.

Learning outcomes:

- 1. Explain sources, composition and generation rate of solid waste (L2)
- 2. Discuss Swachh Bharat Mission (L2)
- 3. Describe the status of solid waste in the first 20 smart cities (L2)

UNIT-II MUNICIPAL SOLID WASTE MANAGEMENT – FUNDAMENTALS:

Municipal Solid Waste, Characteristics and Quantities, Collection, Transportation, Segregation and Processing.

Learning outcomes:

- 1. Outline the characteristics of solid waste. (L2)
- 2. Explain the quantities of solid waste (L2)
- 3. Describe fundamentals of solid waste (L2)

UNIT-III

DISPOSAL OF MUNICIPAL SOLID WASTE:

Landfill, Biochemical Processes and Composting, Energy Recovery from Municipal Solid Waste. Municipal Solid Waste (MSW) Rules 2016.

Learning outcomes:

- 1. Outline the disposal methods of solid waste (L2)
- 2. Explain the energy recovery from MSW (L2)
- 3. Explain MSW Rules 2016 (L2)

(10 Lectures)

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(10 Lectures)

(10 Lectures)

UNIT-IV

CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT:

Overview of C&D Waste – Sources, Effects, and Regulations, Beneficial Reuse of C&D WasteMaterials.

Learning outcomes:

- 1. Discuss about sources and effects of construction waste (L2)
- 2. Explain regulations of construction waste (L2)
- 3. Describe the beneficial reuse of C&D waste materials (L2)

UNIT-V

(10 Lectures)

ELECTRONIC WASTE (E-WASTE) MANAGEMENT:

Sources, Effects, Issues and Status in India and globally, controlling measures, E-Waste Management Rules 2016 and Management Challenges.

Learning outcomes:

- 1. Explain sources and effects of E-Waste (L2)
- 2. Describe the issues and status in India and globally (L2)
- 3. Discuss about the E-Waste management rules 2016 and management challenges (L2)

TEXT BOOKS

- 1. William A Worrell and P. AarneVeslind, "Solid Waste Engineering", 2nd Edition Cengage Learning, 2012 (ISBN-13: 978-1-4390-6217-3)
- 2. George Tchobanoglous, Hilary Theisen and Samuel A Vigil, "Integrated Solid Waste Management", Tata McGraw Hill, 1993.
- 3. The Central Public Health and Environmental Engineering Organization (CPHEEO), "Manual on Solid Waste Management", India, 2016.

REFERENCES

- 1. "Municipal Solid Waste Management Rules 2016", Central Pollution Control Board, Govt. of India, 2016.
- 2. "Electronic Waste Management Rules 2016", Central Pollution Control Board, Govt. of India,2016.
- 3. "Construction and Demolition Waste Management Rules 2016", Ministry of Environment andForest and Climate Change, Govt. of India, 2016.

(10 Lectures)