

5.7.2. SOLID WASTE MANAGEMENT

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RATIONALE

This subject on Solid Waste Management gives the student an overview of municipal solid waste management including collection, transfer, transport, and disposal. Methods of processing, basic disposal facilities, disposal options, and the environmental issues of solid waste management will be covered in this subject. The students will also be able to know about the use of relevant method for disposal of Bio-medical and E-waste.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

- CO1: Identify the sources of solid waste.
- CO2: Select the relevant method of collection and transportation of solid waste.
- CO3: Suggest an action plan for composting of solid waste.
- CO4: Identify suitable disposal technique for solid waste.
- CO5: Use the relevant method for disposal of Bio-medical and E-waste.

DETAILED CONTENTS

UNIT I

Introduction

- 1.1 Definition of solid waste, different solid waste – domestic Waste, commercial waste, industrial waste, market waste, agricultural waste, biomedical waste, E-waste, hazardous waste, institutional waste, etc.
- 1.2 Sources of solid waste, Classification of solid waste – hazardous and non- hazardous waste.
- 1.3 Physical and chemical characteristics of municipal solid waste.

UNIT II**Storage, Collection and Transportation of Municipal Solid Waste**

- 2.1 Collection, segregation, storage and transportation of solid waste.
- 2.2 Tools and Equipment - Litter Bin, Broom, Shovels, Handcarts, Mechanical road sweepers, Community bin - like movable and stationary bin.
- 2.3 Transportation vehicles with their working capacity -Animal carts, Auto vehicles, Tractors or Trailers, Trucks, Dumpers, Compactor vehicles. Transfer station- meaning, necessity, location.
- 2.4 Role of rag pickers and their utility for society.

UNIT– III**Composting of Solid Waste**

- 3.1 Concept of composting of waste, Principles of composting process. Factors affecting the composting process.
- 3.2 Methods of composting – Manual Composting – Bangalore method, Indore Method, Mechanical Composting – Dano Process, Vermi composting.

UNIT IV**Techniques for Disposal of Solid Waste**

- 4.1 Solid waste management techniques – solid waste management hierarchy, waste prevention and waste reduction techniques
- 4.2 Land filling technique, Factors to be considered for site selection, Land filling methods-Area method, Trench method and Ramp method, Leachate and its control, Biogas from landfill, Advantages and disadvantages of landfill method, Recycling of municipal solid waste
- 4.3 Incineration of waste: Introduction of incineration process, Types of incinerators - Flash, Multiple chamber Incinerators, Products of incineration process with their use, Pyrolysis of waste – Definition, Methods.

UNIT V**Biomedical and E-waste management**

- 5.1 Definition of Bio medical Waste.
- 5.2 Sources and generation of Biomedical Waste and its classification
- 5.3 Bio medical waste Management technologies.
- 5.4 Definition, varieties and ill effects of E- waste,
- 5.5 Recycling and disposal of E- waste.

RECOMMENDED BOOKS

1. Gupta O.P, Elements of Solid Hazardous Waste Management, Khanna Book Publishing Co., Delhi Ed. 2018
2. Bhide, A. D., Solid Waste Management, Indian National Scientific Documentation Centre, New Delhi.
3. George Techobanoglous, Kreith, Frank., Solid Waste, McGraw Hill Publication, New Delhi.
4. Sasikumar, K., Solid Waste Management, PHI learning, Delhi.
5. Hosetti, B.B., Prospect and Perspectives of Solid Waste Management, New Age International Publisher.

RECOMMENDED WEBSITES

1. <https://swayam.gov.in/>
2. <https://www.udemy.com/>
3. <https://www.upgrad.com/>
4. <https://www.khanacademy.org/>

INSTRUCTIONAL STRATEGY

The teachers should use teaching aids for classroom teaching. Arrange industry visits to augment classroom teaching-learning process. Arrange expert lectures from the industry experts. This subject contains five units of equal weightage.