



## **23ZOVAP101: Solid Waste Management**

Offered to: ALL UG PROGRAMS

**Course Type: Practical**

**Semester: I**

**45 Hours**

**Credits: 2**

**Course Prerequisites:**

The basic knowledge needed from solid waste management.

**Course Description:**

Industrialization and urbanization is increasing day by day. As a result of this, the generation of solid waste is a major problem all over the country within the urban as well as rural area and it is increasing day by day. In view of this, the management of solid waste produced is of prime need to keep the environment safe and clean

**AIM:**

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences

**OBJECTIVES:**

1. To assess the activities involved for the proposed and determine the type, nature and estimated volumes of waste to be generated
2. To identify any potential environmental impacts from the generation of waste at the site;
3. To recommend appropriate waste handling and disposal measures / routings in accordance with the current legislative and administrative requirements.
4. To categories waste material where practicable (inert material / waste fractions) for disposal considerations i.e. public filling areas / landfill.

**COURSE OUTCOMES:**

CO1	Identify the different sources of solid wastes.
CO2	Execute the relevant method of collection and transportation of solid wastes.
CO3	Implement the relevant method for disposal of Bio-medical wastes.
CO4	Implement the relevant method for disposal of Industrial wastes and E-waste.
CO5	Implement the relevant laws related to solid waste management.

**Syllabus:**

Unit -I	<p><b>Fundamentals of solid waste management</b></p> <p>1.1 Definition of solid waste          1.2 Meaning of different solid waste — Domestic Waste, commercial waste, industrial waste, market waste, agricultural waste, biomedical waste, E-waste, hazardous waste, institutional waste          1.3 Sources of solid waste, Classification of solid waste — hazardous and non-hazardous waste.          1.4. Impact of solid waste on environment and prevention and waste reduction Techniques.          1.5. Factors affecting the solid waste generation.</p>	9hrs
Unit -II	<p><b>Storage, Collection and Transportation on of Municipal Solid Waste</b></p> <p>2.1 Storage of solid waste          2.2 Collection methods of solid waste          2.3 Tools and Equipment-Litter Bin, Broom, Shovels, Handcarts, Mechanical road sweepers, Community bin - like movable and stationary bin          2.4 Transportation of municipal waste.</p>	9hrs
Unit – III	<p><b>Disposal of Municipal Solid Waste</b></p> <p>3.1 Concept of composting of waste, Principles of composting process. Factors affecting the composting process          3.2 Methods of composting          A) Manual Composting — Bangalore method, Indore Method          B) Vermicomposting.          3.3. Recycling of municipal solid waste</p>	9hrs
Unit – IV	<p><b>Biomedical Waste management and Health aspects and public Involvement in Solid Waste Management.</b></p> <p>Biomedical Waste Management          4.1 Definition of Bio medical Waste.          4.2 Sources and generation of Biomedical Waste          4.3 Management technologies. Health aspects and public Involvement in solid waste management          4.4.. Health problems during time of segregation, recovery, recycling and reuse of solid waste.</p>	9hrs
<u>Unit-V</u>	<p><b>Industrial waste management and E-waste management</b></p> <p><b>Industrial waste management</b></p> <p>5.1. Variety of industrial waste          5.2. Collection and disposal of industrial waste.          5.3. Recycling of industrial waste.</p> <p><b>E-waste Management</b></p> <p>5.5. Definition of E- waste, Varieties of E- wastes, Dangers of E- waste,          5.6. Recycling of E- waste.          5.7. Disposal of E- waste.</p>	<u>9Hrs</u>

### **Reference books:**

1. Ackerman, F., 2000: Waste Management and Climate Change. *Local Environment*, 5(2), pp. 223-229.
2. Austrian Federal Government, 2001: Third National Climate Report of the Austrian Federal Government. Vienna, Austria.
3. Barlaz, M., 1998: Carbon storage during biodegradation of municipal solid waste components in laboratory-scale landfills. *Global Biogeochemical Cycles*, 12(2), pp. 373-380.
4. Barlaz, M., R. Green, J. Chanton, R.D. Goldsmith, and G. Hater, 2004: Evaluation of a biologically-active cover for mitigation of landfill gas emissions. *Environmental Science and Technology*, 38(18), pp. 4891-4899.
5. Bates, J. and A. Haworth, 2001: Economic evaluation of emission reductions of methane in the waste sector in the EU: Bottom-up analysis. Final Report to DG Environment, European Commission by Ecofys Energy and Environment, by AEA Technology Environment and National Technical University of Athens as part of Economic Evaluation of Sectoral Emission Reduction Objective for Climate Change, 73 pp.
6. Beck-Friis, B.G. 2001: *Emissions of ammonia, N<sub>2</sub>O, and CH<sub>4</sub> during composting of organic household waste*. PhD Thesis, Swedish University of Agricultural Sciences, Uppsala, 331 pp.

**Course Delivery method:** Face-to-face / Blended.

**Course has focused on:** Skill Development

### **WEB LINKS:**

[HTTPS://WWW.YOUTUBE.COM/WATCH?V=2F3KDJDDF0W](https://www.youtube.com/watch?v=2f3KDJDDF0W)

[HTTPS://WWW.YOUTUBE.COM/WATCH?V=sb4NSGVDKQU](https://www.youtube.com/watch?v=sb4NSGVDKQU)

### **Co-curricular Activities:**

1. Conduct nature walks to observe local flora and fauna,
2. organize waste segregation drives, and involve students in tree planting campaigns
3. Host eco-friendly art and craft workshops using recycled materials.
4. Arrange talks by local environmentalists to share insights.
5. Collecting, treating and disposing of solid wastes with students.

**SEE Model Question paper**

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**Semester: I**

Max.Time: 2hrs.

Max. Marks 35

Pass Min: 14

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Answer the following questions

1. Write an essay on Different types of solid wastes. 10M

2. Preparation of vermi bed Write the procedure and preparation 10M

Procedure -5M

Preparation – 10M

3. Procedure of Recycling E waste management. 10M

4. Viva voce 5M

**(B) CONTINUOUS ASSESSMENT:**

TOTAL : (A)+(B) =

**15 MARKS**

50MARKS

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