

UNIVERSITY OF JAMMU
Syllabus for FYUP Program in ENVIRONMENTAL SCIENCES
(Under CBCS as per NEP-2020)

UG SEMESTER-1

(For the examinations to be held in the years December 2023, 2024, 2025)

SOLID WASTE MANAGEMENT
(SKILL ENHANCEMENT COURSE)

Course Code: USEEST104 Max. Marks: 50 (Theory-25, Practical-25)

	Credits	Contact Hours	Units	Examination			
				Weightage (Marks)		Duration (hours)	
				Mid Semester Assessment	End Semester Examination	Mid Semester Assessment	End Semester Examination
Theory	01	15	1 to 2	05	20	1	2.5
Practical	01	30	3	-	25	-	-

Objectives:

- To introduce the students to causes and associated problems of different types of solid wastes.
- To introduce the students about various methods of solid waste management.

Learning outcomes:

Students shall be able to

- differentiate between different types of solid wastes.
- understand various solid waste management strategies.

UNIT 1: BASIC CONCEPTS AND MANAGEMENT PRACTICES

- 1.1 Solid waste: Definition and concept, Sources and classification of Solid Waste
- 1.2 Factors affecting the generation of Solid Waste, Impact of solid waste on Environment, human and plant health
- 1.3 Management MSW-biodegradable waste: composting, vermicomposting, farmyard manure, biogas Production
- 1.4 Management of MSW-non-biodegradable waste: incineration, pyrolysis, gasification, sanitary landfills

UNIT 2: SOLID WASTE COLLECTION AND PROCESSING TECHNIQUES

- 2.1 Handling and segregation of solid waste at source and methods of separation, Solid waste reduction technique
- 2.2 Collection of solid waste and Transfer and transportation of solid waste, Solid waste processing methods (storage, conveying, compacting, shredding, pulping, granulating)
- 2.3 Sanitary landfill Selection Criteria
- 2.4 Solid Waste Management Rules, 2016: Salient Features

UNIT 3: PRACTICALS

- 3.1 Qualitative and Quantitative estimation of solid waste from Household/commercial /Institutional areas.
- 3.2 Cost estimation of recyclable waste generated from households /commercial /Institutional areas
- 3.3 Making recycled paper/paper items from used newspapers/paper
- 3.4 Preparation and collection of items from recycled/reused material
- 3.5 Laboratory demonstration of Vermicomposting
- 3.6 Laboratory demonstration of Aerobic Composting
- 3.7 Field visits to waste dumping/disposal site
- 3.8 Field visit to paper recycling unit or any other recycling unit.
- 3.9 Field visit to plastic recycling unit or any other recycling unit.

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UG SEMESTER-2

(For the examinations to be held in the years May 2024, 2025, 2026)

LIQUID WASTE MANAGEMENT
(SKILL ENHANCEMENT COURSE)

Course Code: USEEST204

Max. Marks: 50 (Theory-25, Practical-25)

	Credits	Contact Hours	Units	Examination			
				Weightage (Marks)		Duration (hours)	
				Mid Semester Assessment	End Semester Examination	Mid Semester Assessment	End Semester Examination
Theory	01	15	1 to 2	05	20	1	2.5
Practical	01	30	3	-	25	-	-

Objectives:

- To introduce the students to causes, associated problems and control of different types of liquid waste pollution.
- To make the students aware about various steps involved in wastewater treatment.

Learning outcomes:

Students shall be able to

- differentiate between different types of liquid wastes.
- understand working and applications of various wastewater treatment technologies.

UNIT 1: INTRODUCTION TO LIQUID WASTES

- 1.1 Water as a resource and its significance
- 1.2 Water pollution I: Types, sources and impacts, surface water and groundwater pollution
- 1.3 Water pollution II: Wastewater: Domestic black and grey water; agricultural wastewater
- 1.4 Characteristics of industrial wastewater, types of industrial pollutants

UNIT 2: WASTEWATER TREATMENT

- 2.1 Wastewater Treatment: Primary treatment, Pre-treatment: Screening, Grit removal, Flow equalization, Sedimentation.
- 2.2 Secondary Treatment: Chemical unit processes: Precipitation, Coagulation, Disinfection
- 2.3 Secondary Treatment: Biological unit processes: Aerobic process - activated sludge system, trickling filters, Anaerobic process - CSTR (Continuous stirred tank reactors), Anaerobic Filters, UASB (Upflow anaerobic sludge blanket technology)
- 2.4 Tertiary treatment, Concepts and treatment of wastewater with aquatic macrophytes, thin film techniques for wastewater treatment using aquatic plants, Algal treatment Systems

UNIT 3: PRACTICALS

- 3.1 To determine the Total Suspended Solids (TSS) in Water.
- 3.2 To determine the Total dissolved Solids (TDS) in Water.
- 3.3 To determine the turbidity difference between clean and turbid water.
- 3.4 To determine of Colour of Water.
- 3.5 To determine of pH of Water.
- 3.6 Visit to Sewage treatment plant (STP).
- 3.7 Visit to Drinking water treatment plant.
- 3.8 Visit to Effluent treatment plant (ETP) of nearby industry.

SUGGESTED READINGS

1. Tchobanoglous, G. and Burton, F.L. (1979). Waste water engineering: Treatment, Disposal, and Reuse. Tata McGraw Hill, New Delhi.
2. Garg, S. K. (2003) Sewage Disposal and Air Pollution Engineering, Khanna Publishers, Delhi.
3. Manual of Water Supply and Treatment (1999). Central Public Health and Environmental Engineering Organisation, Ministry of Urban Development, New Delhi.