

Course No.	Course Name	L-T-P-Credits	Year of Introduction
CH471	SOLID WASTE MANAGEMENT	3-0-0-3	2016
Prerequisite : Nil			
Course Objectives			
<ul style="list-style-type: none"> To impart the basic concepts of solid waste management To develop understanding about recovery, reuse and disposal of solid waste. 			
Syllabus			
Sources of solid waste, types of solid wastes, Properties of solid wastes, generation rates of solid wastes, factors affecting generation rates, collection and storage of solid wastes, collection systems and routing of solid waste collection systems, recovery and reuse, disposal methods of solid wastes, design and operation of solid waste disposal systems, recovery, recycle and reuse of solid wastes and solid waste management practices in India.			
Expected Outcome			
The students will be able to			
<ol style="list-style-type: none"> Explain municipal solid waste management systems with respect to its physical, chemical and biological properties. Select appropriate method for solid waste collection, transportation, redistribution and disposal. Develop an optimum route for solid waste collection and transportation Manage industrial and hazardous solid wastes. Compare disposal methods of MSW by applying specific criteria. 			
Text Book			
P.Aarne Vesilind and William Worrell, Solid waste Engineering, Cengage Learning			
Reference Books			
<ol style="list-style-type: none"> Frank Kreith, George Tchobanoglous, Handbook of Solid Waste Management, McGraw Hill Publishers. Gerard Kiely, Environmental Engineering, McGraw Hill Howard S.Peavy, Donald R.Rowe, George Tchobanoglous, Environmental Engineering, Mc Graw Hill Nicholas P. Cheremisinoff, Handbook of Solid Waste Management and Waste Minimization Technologies , Elsevier 			
Course Plan			
Module	Contents	Hours	Sem. exam marks
I	Solid wastes-Sources, nature and characteristics - types of solid waste, Residential, Commercial ,Hazardous wastes, and Industrial wastes, Properties of Solid wastes, Waste generation, Sampling and analysis, Characteristics of solid wastes - Energy content, Chemical content, Estimation of chemical composition of of a solid waste sample	6	15%
II	Changing nature of solid wastes and its impact on solid waste management, Generation rates - Estimation of solid waste	7	15%

	quantities - Factors affecting generation rates , Collection of solid waste, On-site storage methods-containers, their type, size and location.		
FIRST INTERNAL EXAMINATION			
III	Collection systems-Vehicles, Types of collection system –HCS, SCS , Determination of vehicle and labor requirements, Collection routing, route balancing and transfer stations, Transfer methods Processing methods.	8	15%
IV	Recovery and reuse of materials and energy, Disposal methods such as sanitary landfill –methods, leachate in landfills – control of leachate movement , Gas movement – control.	8	15%
SECOND INTERNAL EXAMINATION			
V	Design and operation of landfills, Landfarming, Deep well injection,etc. Composting, Factors affecting composting, Aerobic composting and anaerobic Digestion, Design principles. Incineration, Municipal incinerators, Grates, Furnances, Design principles, Pyrolysis of solid waste.	7	20%
VI	Recovery, Recycle and Reuse-Material and Energy recovery operations. Overview of solid waste management practices in India. Industrial and Hazardous solid waste management, Integrated Waste Management (IWM)	6	20%
END SEMESTER EXAM			

Question Paper Pattern

Maximum Marks: 100

Exam Duration: 3 Hours

Part A: There shall be **Three questions** uniformly covering Modules 1 and 2, each carrying 15 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 15 marks for all the subdivisions put together.

(2 x15= 30 Marks)

Part B: There shall be **Three questions** uniformly covering Modules 3 and 4, each carrying 15 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 15 marks for all the subdivisions put together.

(2 x15= 30 Marks)

Part C: There shall be **Three questions** uniformly covering Modules 5 and 6, each carrying 20 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 20 marks for all the subdivisions put together.

(2 x20= 40 Marks)