College of Engineering

Department of Civil Engineering

CE 546 Solid Waste Management

Credit and Contact hours	3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Required for a MSCE degree
Course Description	Study of the engineering and management principles, practices, and techniques for the management and disposal of solid wastes. Topics include characteristics, generation, transport, processing, resource recovery, disposal, landfill design and operation, leachate management, and contaminant transport.
Prerequisites or Co-requisites	None
Course Learning Outcomes	Students completing this course successfully will be able to

Course Learning Outcomes	***Related Program Outcomes***
CLO1: Identify the solid waste demands that must be met by engineers and the impacts of legislation on engineering and scientific activity in solid waste management.	**K1**
CLO2: Identify sources, types, and composition of solid waste, in addition to the physical, chemical, and biological properties and transformations of waste materials.	**K1**
CLO3: Recognize the processing of MSW such as sorting and compaction, transportation and final processing	**K1**
CLO4: Determine quantities of waste materials that can be recovered from MSW for effective separation and processing of solid waste components.	**S1**
CLO5: Develop design strategies depending on the solid waste composition to transform solid waste using thermal, biological and chemical conversion technologies	**S1**
CLO6: Develop of closure plans and guidelines for the long term care (operational and maintenance of closed landfills) in real-life projects. In addition to studying the Impact of inactive landfills and determining the need for remediation.	**C2**

	CLO7: Present layout and preliminary design of landfills, develope an operational plan, landfill closure and post-closure care, and landfill design computations for real-life projects. — **C2**
Student Outcomes related to this Course	**K1**. Recognize advanced engineering knowledge, concepts and techniques to identify, interpret and analyze complex and real-life engineering problems. **S1**. Provide solution for complex and real-life engineering problems through critical thinking and using modern engineering tools and identify its impact on social and ethical issues. **C2**. Design novel advanced Civil Engineering systems and evaluate its performance and effectiveness for engineering practice and its impact on society.
Topics Covered	

List of Topics	Related CLOs
1. Introduction and evolution of solid waste management	CLO1
2. Sources, composition, and properties	COL2
3. Solid waste generation rates	CLO1
4. Waste handling, separation, storage, and processing at the source	CLO4
5. Collection of solid waste and source-separated materials	CLO4
6. Separation processes, and transformation of waste materials	CLO5
7. Waste/transfer and transport	CLO4
8. Disposal of solid wastes and residual matter	CLO3
9. Closure of landfills	CLO7
10. Remedial actions for abandoned waste disposal sites	CLO6
11. Recycling of waste materials	CLO4

Textbook(s) and Other Required Material	1. Tchobanoglous G., Theisen H., Vigil S. A. " Integrated Solid Waste Management: Engineering Principles and Management Issues, McGraw-Hill (1993).
Grading System	Assignments 20% Research Work 20% Midterm Exam 20% Final Exam 40%
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