

College of Engineering

Department of Civil Engineering

جامعة  
الملك سعود  
King Saud University



## CE 449 Introduction to Solid Waste Management

<b>Credit and Contact hours</b>	3 / 3 (Lectures), 1 (Tutorials), 0 (Laboratory)	
<b>Required, or Elective</b>	Elective for a BSCE degree	
<b>Course Description</b>	Municipal solidwaste generation, characteristics and generation rates - Reuse and recycling of municipal solidwaste -Solidwaste Management – Collection and transport – Material recovery facilities – Transfer stations – Methods of municipal solidwaste disposal including sanitary landfilling – Hazardous solidwastes and disposal processes.	
<b>Prerequisites or Co-requisites</b>	CE 447 (Water Supply and Drainage Systems), CE 448 (Water and Wastewater Treatment)	
<b>Course Learning Outcomes</b>	Students completing this course successfully will be able to	
	<b>Course Learning Outcomes</b>	<b>Related Student Outcomes (SO)</b>
	<b>CLO1.</b> Identify key sources, typical quantities generated, composition, and properties of solid and hazardous wastes in order to design and plan Solid Waste Management Program	<b>SO1</b>
	<b>CLO2.</b> Identify waste disposal and complex transformation technics (landfills and incinerators); due to various physical, chemical and biological aspects to be able to design Sanitary Landfill	<b>SO1</b>
	<b>CLO3.</b> design of Modern Solid and Hazardous Waste Landfills with the consideration of relevant regulations that apply for facilities used for disposal, and destruction of waste, public health, in addition to environmental and economics factors	<b>SO2</b>
<b>CLO4.</b> Identify new trends in Recycling of Solid Waste. reuse options, and applications for energy recovery (through literature review – report)	<b>SO7</b>	
<b>Student Outcomes related to this Course</b>	<b>SO 1.</b> an ability to <b>identify, formulate,</b> and <b>solve complex engineering</b> problems by applying principles of engineering, science, and mathematics, and using <b>modern engineering tools</b> [ ABET 1].	

	<p><b>SO 2.</b> an ability to apply <b>engineering design</b> to produce solutions that meet specified needs with consideration of <b>public health, safety, and welfare</b>, as well as <b>global, cultural, social, environmental, and economic factors</b>. [ABET 2]</p> <p><b>SO 7.</b> an ability to <b>acquire</b> and <b>apply new knowledge</b> as needed, using <b>appropriate learning strategies</b>. [ABET 7]</p>	
<b>Topics Covered</b>	<b>List of Topics</b>	<b>Related CLOs</b>
	1. Introduction to solid waste management	CLO 1
	2. Sources and types of solid wastes;	CLO 1
	3. Physical and chemical properties of solid wastes;	CLO 2
	4. Solid wastes generation;	CLO 2
	5. On-site handling, storage and processing and collection of solid wastes (Relevant Regulations)	CLO 3
	6. Transfer stations and transport (Relevant Regulations);	CLO 3
	7. Ultimate disposal methods (Relevant Regulations);	CLO 3
	8. Reuse and Recycling of Solid Waste& Resources and energy recovery;	CLO 4
	9. Solid Waste disposal – Sanitary Landfill(Design and Operation);	CLO 4
	10. Hazardous Solid Wastes and Disposal Processes;	CLO 4
<b>Textbook(s) and Other Required Material</b>	<ol style="list-style-type: none"> <li>1. Handbook of Solid Waste Management, George Tchobanoglous and Frank Kreith, LastEdition, Publisher: McGraw-Hill</li> <li>2. Solid Waste Management: Principles and Practice, Ramesha Chandrappa,Publisher: Springer;</li> <li>3. Integrated Solid Waste Management: A Life Cycle Inventory, Forbes R. McDougall, Peter R. White, Marina Franke, Peter Hindle</li> </ol>	
<b>Grading System</b>	Homeworks	10%
	Project work	10%
	Two Midterm Exams	40%
	Final Examination	40%
<b>Instructors</b>	Prof. Ashraf M.I. Refaat (Room 2A4), email; refaat@ksu.edu.sa	
<b>Date of Review</b>	September 2020	