

## CE 589 Special Topics in Geotechnical Engineering

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)								
Required, or Elective	Required								
Course Description	This course deals with special topics in geotechnical engineering which are of current interest to the faculty. And learning special topics in Geotechnical engineering that cover the latest state-of-the-art.								
Prerequisites or Co-requisites	None								
Course Learning Outcomes	Students completing this course successfully will be able to:								
	<table><tr><th>Course Learning Outcomes (CLOs)</th><th>Related Student Outcomes (SO)</th></tr><tr><td>CLO1. Recognize the selected special topics of interest in Geotechnical engineering. K1</td><td>SO1</td></tr><tr><td>CLO2. Apply the related state-of-the-art analysis and design in advanced applications through a group-project. S1</td><td>SO2</td></tr><tr><td>CLO4. Evaluate and discuss the current state-of-the-art methods of Geotechnical analysis and design for advanced applications. S3</td><td>SO4</td></tr></table>	Course Learning Outcomes (CLOs)	Related Student Outcomes (SO)	CLO1. Recognize the selected special topics of interest in Geotechnical engineering. K1	SO1	CLO2. Apply the related state-of-the-art analysis and design in advanced applications through a group-project. S1	SO2	CLO4. Evaluate and discuss the current state-of-the-art methods of Geotechnical analysis and design for advanced applications. S3	SO4
	Course Learning Outcomes (CLOs)	Related Student Outcomes (SO)							
	CLO1. Recognize the selected special topics of interest in Geotechnical engineering. K1	SO1							
	CLO2. Apply the related state-of-the-art analysis and design in advanced applications through a group-project. S1	SO2							
CLO4. Evaluate and discuss the current state-of-the-art methods of Geotechnical analysis and design for advanced applications. S3	SO4								
Student Outcomes related to this Course	SO 1 Recognize advanced engineering knowledge, concepts, and techniques to identify, interpret, and analyze complex and real-life engineering problems.								
	SO 2 Provide solutions for complex and real-life engineering problems through critical thinking and the use of modern engineering tools, and identify their impact on social, global, cultural, environmental, safety, and economic factors.								
	SO 3 Criticize and discuss scientific research reports /papers related to Civil Engineering issues with a high level of ethics proficiency and communication skills, independently, or as a teamwork.								

<b>Topics Covered</b>	<b>List of Topics</b>	<b>Related CLOs</b>
	1. Introduction about special topic in geotechnical engineering	<b>CLO 1</b>
	2. Topics may be selected from the following but not limited to these topics:	<b>CLO 1</b>
	3. Topic #1: Unsaturated Soil Mechanics	<b>CLO 2,3</b>
	4. Topic #2: Behavior of Pile Walls in Liquefying Soil Layers	<b>CLO 2,3</b>
	5. Topic #3: Design of a foundation against earthquake	<b>CLO 2,3</b>
	6. Topic #4: Utilization of waste materials in the landfill	<b>CLO 2,3</b>
	7. Topic #5: Liquefaction Modeling Using Computer Techniques.	<b>CLO 2,3</b>
	8. Topic #6: Strengthening of Weak Soil Against Liquefaction	<b>CLO 2,3</b>
	9. Topic #7: Improvement of Expansive Soil by Deep In-situ Technique	<b>CLO 2,3</b>
	10. Topic #8: Studies on Construction of Embankments on Soft Clay Soil Using Geocell layers and Stone Columns	<b>CLO 2,3</b>
	11. Topic #9: Tunneling Engineering.	<b>CLO 2,3</b>
	12. Topic #10: Numerical Simulation of Geotechnical Problems.	<b>CLO 2,3</b>
<b>Textbook(s) and Other Required Material</b>	<ul style="list-style-type: none"> <li>• Some books are recommended for certain topics</li> <li>• Notes are distributed for some of the topics.</li> <li>• Students are supplied with and encouraged to read excerpts from different books and technical papers relevant to some of the covered topics</li> </ul>	
<b>Grading System</b>	Midterm Exam	30%
	Assignments	15%
	Term Project	15%
	Final Exam	40%
<b>Instructors</b>	Appointed Faculty	
<b>Date of Review</b>	November, 2024	