College of Engineering

Department of Civil Engineering

CE 583 Retaining Structures and Slopes

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Required
Course Description	Limit equilibrium and limit analysis methods. Pressures on earth retaining structures. Analysis, design, and construction of retaining structures. Stability of natural and man-made slopes under various loading conditions.
Prerequisites or Co-requisites	None
Course Learning Outcomes	Students completing this course successfully will be able to:

Course Learning Outcomes (CLOs)	*Related Student Outcomes (SO)*
CLO1. Acquire theoretical concept of earth retaining structures and slopes. K1	**SO1**
CLO2. Identify Pressures on earth retaining structures. K1	**SO1**
CLO3. Recognize the limit equilibrium and limit analysis methods. K1	**SO1**
CLO4. Recognize different type of retaining structures. K1	**SO1**
CLO5. Identify the optimum method of design and selection of wall. K1	**SO1**
CLO6. Analyze retaining structures and stability of natural and man-made slopes under various loading conditions. S1	**SO2**
CLO7. Design of retaining structures and stability of natural and man-made slopes under various loading conditions. S4	**SO5**
CLO8. Demonstrate professional engineering and ethical values in assigned projects and assignments, with high academic integrity. V1	**SO6**

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 5 Design novel advanced Civil Engineering systems and evaluate their performance, sustainability, and effectiveness for engineering practice and their impact in global, economic, environmental, and societal contexts

SO 6 Demonstrate scientific integrity, ethical responsibility, and academic values in scientific publications, research projects, and thesis work.

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<tr><td>Topics Covered</td><td>
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<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Introduction</td><td>CLO 1,2</td></tr>
<tr><td>2. Factors Affecting Earth Pressure</td><td>CLO 1,2</td></tr>
<tr><td>3. Limit analysis</td><td>CLO 3</td></tr>
<tr><td>4. Limit Equilibrium Analyses</td><td>CLO 3</td></tr>
<tr><td>5. Water and Retaining Structures</td><td>CLO 4,5</td></tr>
<tr><td>6. Global and Local Instability</td><td>CLO 1,2,6</td></tr>
<tr><td>7. Wall Selection</td><td>CLO 5</td></tr>
<tr><td>8. Avoiding Failure</td><td>CLO 5,8</td></tr>
<tr><td>9. Gravity and Embedded Walls</td><td>CLO 5,8</td></tr>
<tr><td>10. Composite Walls and other Support Systems</td><td>CLO 5,6,8</td></tr>
<tr><td>11. Methods of Analyzing Slope Stability</td><td>CLO 6,7</td></tr>
<tr><td>12. Factors of Safety and Reliability</td><td>CLO 6,7</td></tr>
<tr><td>13. Reinforced Slopes and Embankments</td><td>CLO 6-8</td></tr>
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<tr><td>Textbook(s) and Other Required Material</td><td>

Clayton, C. R. I., Woods, R. I., Bond, A. J., & Milititsky, J. (2014). Earth pressure and earth-retaining structures. Boca Raton: CRC Press.
Duncan, J. M., Wright, S. G., & Brandon, T. L. (2014). Soil Strength and Slope Stability, 2nd Edition. John Wiley & Sons.

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<tr><td>Grading System</td><td>
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<tr><td>Assignments</td><td>10 %</td></tr>
<tr><td>Term Papers No. 1</td><td>10 %</td></tr>
<tr><td>Term Papers No. 2</td><td>10 %</td></tr>
<tr><td>Mid-term exams</td><td>30 %</td></tr>
<tr><td>Final Exam</td><td>40 %</td></tr>
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<tr><td>Instructors</td><td>Prof. Ahmed Alnuaim</td></tr>
<tr><td>Date of Review</td><td>November, 2024</td></tr>
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