College of Engineering

Department of Civil Engineering

Advanced Shallow Foundation Engineering

Credit and Contact hours	3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Required for a MSCE degree
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	*Related Program Outcomes*
CLO1: Recognize the theoretical concept of the earth retaining structures and slopes	**K1**
CLO2: Identify the Pressures on earth retaining structures	**K1**
CLO3: Recognize the limit equilibrium and limit analysis methods	**K1**
CLO4: Recognize different type of retaining structures	**K1**
CLO5: Identify the optimum method of design and selection of wall.	**K1**
CLO6: Analyze retaining structures and stability of natural and man-made slopes under various loading condition	**S1**
CLO7: Design retaining structures and stability of natural and man-made slopes under various loading conditions.	**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.

<table>
<tr><td></td><td>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.</td></tr>
<tr><td>Topics Covered</td><td>
<table>
<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Introduction</td><td>CLO1</td></tr>
<tr><td>2. Factors Affecting Earth Pressure</td><td>CLO2</td></tr>
<tr><td>3. Limit analysis</td><td>CLO3</td></tr>
<tr><td>4. Limit Equilibrium Analyses</td><td>CLO3</td></tr>
<tr><td>5. Water and Retaining Structures</td><td>CLO4</td></tr>
<tr><td>6. Global and Local Instability</td><td>CLO5</td></tr>
<tr><td>7. Wall Selection</td><td>CLO4</td></tr>
<tr><td>8. Avoiding Failure</td><td>CLO6</td></tr>
<tr><td>9. Gravity and Embedded Walls</td><td>CLO5</td></tr>
<tr><td>10. Composite Walls and other Support Systems</td><td>CLO5</td></tr>
<tr><td>11. Methods of Analyzing Slope Stability</td><td>CLO6</td></tr>
<tr><td>12. Factors of Safety and Reliability</td><td>CLO7</td></tr>
<tr><td>13. Reinforced Slopes and Embankments</td><td>CLO7</td></tr>
</table>
</td></tr>
<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.</td></tr>
<tr><td>Grading System</td><td>Assignments 10%
Term Papers No. 1 10%
Term Papers No. 2 10%
Midterm Exam 30%
Final Exam 40%</td></tr>
<tr><td>Instructors</td><td>Dr. Abdullah Alsabhan (2 A 22/3) E-mail: aalsabhan@ksu.edu.sa</td></tr>
<tr><td>Date of Review</td><td>March, 2021</td></tr>
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