

CE 537 Advanced Pavement Design

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)																
Required, or Elective	Elective																
Course Description	<p>The course provides master students an advanced topics in pavement analysis and design. The course also includes topics related to pavement rehabilitation. The course covers topics in distresses in flexible and rigid pavements, pavement performance, evaluation of the structural condition of a pavement, elastic and viscoelastic layer system, mechanistic-empirical pavement design (AASHTOW are Pavement ME Design), sustainable pavement perpetual pavement, and overlay design for both flexible and rigid pavements. The course may include pavement materials testing if the student did not have previous knowledge. Besides these topics, the course attempts to address recent topics related to pavement design through reviewing recently published research. The course includes report/research assignments on the topics covered.</p>																
Prerequisites or Co-requisites	None																
Course Learning Outcomes	<p>Students completing this course successfully will be able to:</p> <table> <thead> <tr> <th>Course Learning Outcomes (CLOs)</th><th>Related Student Outcomes (SO)</th></tr> </thead> <tbody> <tr> <td>CLO1. Determine stresses and strains in flexible and rigid pavements. S1</td><td>SO2</td></tr> <tr> <td>CLO2. Analyze pavement structures. S1</td><td>SO2</td></tr> <tr> <td>CLO3. Design flexible and rigid pavements by the Mechanistic Empirical method. S2</td><td>SO3</td></tr> <tr> <td>CLO4. Evaluate the performance of existing pavements. S1</td><td>SO2</td></tr> <tr> <td>CLO5. Design overlay for existing pavements. V1</td><td>SO6</td></tr> <tr> <td>CLO6. Make decision regarding the use of sustainable pavement and perpetual pavement. V1</td><td>SO6</td></tr> <tr> <td>CLO7. Evaluate recent research and state-of-art in pavement developments, and judge its applicability in practice. V2</td><td>SO7</td></tr> </tbody> </table>	Course Learning Outcomes (CLOs)	Related Student Outcomes (SO)	CLO1. Determine stresses and strains in flexible and rigid pavements. S1	SO2	CLO2. Analyze pavement structures. S1	SO2	CLO3. Design flexible and rigid pavements by the Mechanistic Empirical method. S2	SO3	CLO4. Evaluate the performance of existing pavements. S1	SO2	CLO5. Design overlay for existing pavements. V1	SO6	CLO6. Make decision regarding the use of sustainable pavement and perpetual pavement. V1	SO6	CLO7. Evaluate recent research and state-of-art in pavement developments, and judge its applicability in practice. V2	SO7
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Student Outcomes related to this Course	<p>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.</p> <p>SO 3 Investigate scientific research problems independently or through teamwork using critical thinking, appropriate techniques, advanced tools, and management principles.</p>																

	<p>SO 6 Demonstrate scientific integrity, ethical responsibility, and academic values in scientific publications, research projects, and thesis work.</p> <p>SO 7 Effectively manage, individually or in groups, specialized tasks and activities in coursework, projects, assignments, and research work with a high level of autonomy and responsibility.</p>																				
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Textbook(s) and Other Required Material	<ul style="list-style-type: none"> • Huang, Y. H. (2004). Pavement Analysis and Design. Pearson Education. • Rajib Mallik, Tahar ElKorchi, Pavement Engineering: Principles and Practice, 3rd Edition, 2017 																				
Grading System	<table> <tr> <td>Work Sheet, Assignments and Quizzes</td><td>15%</td></tr> <tr> <td>Research Report</td><td>5%</td></tr> <tr> <td>Midterm Exam</td><td>25%</td></tr> <tr> <td>Term Project Work</td><td>15%</td></tr> <tr> <td>Final Exam</td><td>40%</td></tr> </table>	Work Sheet, Assignments and Quizzes	15%	Research Report	5%	Midterm Exam	25%	Term Project Work	15%	Final Exam	40%										
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