College of Engineering

Department of Civil Engineering

CE 538 Pavement Evaluation and Maintenance

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Required
Course Description	The course provides master student the principles and technologies of pavement evaluation and maintenance including pavement inspection and pavement data acquisition. The course covers topics in pavement performance, pavement evaluation methods, distresses identification, visual inspection, roughness measurements, skid resistance, structural evaluation, pavement maintenance needs, levels and methods of maintenance, economic analysis of pavement maintenance strategies. Students are expected to carry out pavement evaluations and set maintenance measures for certain pavement sections to practice on real-life situation. Besides these topics, the course attempts to address recent topics related to pavement maintenance through reviewing recently published research. The course includes report/research assignments on the topics covered.
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. Explain the concept of pavement inspection and evaluation. K1	**SO1**
CLO2. Explain the concept of pavement serviceability and pavement maintenance. K1	**SO1**
CLO3. Determine maintenance needs and maintenance strategies in real-life conditions. S1	**SO2**
CLO4. Conduct economic analysis of pavement maintenance and rehabilitation strategies in real-life conditions using computer programs. S1	**SO2**
CLO5. Evaluate existing pavement conditions (pavement distresses, pavement roughness, skid resistance and structural capacity) and to set appropriate maintenance measures. 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.

<table>
<tr><td></td><td>SO 6 Demonstrate scientific integrity, ethical responsibility, and academic values in scientific publications, research projects, and thesis work.</td></tr>
<tr><td>Topics Covered</td><td>
<table>
<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Pavement evaluation, Distresses identification and measurement</td><td>CLO 1</td></tr>
<tr><td>2. Pavement visual inspection, Measurement of surface roughness. Skid resistance, Structural evaluation.</td><td>CLO 1,2</td></tr>
<tr><td>3. Levels and types of maintenance needs.</td><td>CLO 3,5</td></tr>
<tr><td>4. Application of maintenance activities</td><td>CLO 3,4</td></tr>
<tr><td>5. Economic analysis of maintenance strategies.</td><td>CLO 1,4</td></tr>
<tr><td>6. Use of computer programs to analyze and select maintenance strategies</td><td>CLO 1,4,5</td></tr>
</table>
</td></tr>
<tr><td>Textbook(s) and Other Required Material</td><td>

Modern Pavement Management, by R. Haas, R. Hudson and Zaniewski.
Pavement Asset Management, by R. Haas, R. Hudson and L. Falls

Other Supportive References:

Distress Identification Manual for the Long-Term Pavement Performance Program”, Publication No. FHWA-RD 03-031, June 2003. · Interpretation of Falling Weight Deflectometer data.
The Asphalt Handbook, Asphalt Institute Manual Series MS-16.
Best Practices Handbook: Asphalt Pavement Maintenance, by A. Johnson.
Mechanistic-Empirical Pavement Design Guide – A Manual of Practice, American Association of State Highway and Transportation Officials (AASHTO), 2nd edition, 2015, Publication Code: MEPDG-2, ISBN: 978-1-56051-597-5.
Highway Engineering, by A. Nikolaides
Journal of the Association of Asphalt Paving Technologists
International Journal of Pavement Engineering

</td></tr>
<tr><td>Grading System</td><td>
Work Sheet, Assignments and Quizzes 20%
Midterm Exam 20%
Term Project Work/Research Report 20%
Final Exam 40%
</td></tr>
<tr><td>Instructors</td><td>Dr. Hamad Alsulayman</td></tr>
<tr><td>Date of Review</td><td>November, 2024</td></tr>
</table>