


College of Engineering Department of Civil Engineering		<div>جامعة الملك سعود King Saud University</div> <div> 1957</div>
CE 555 Pavement Materials and Design of Asphalt mixes		
Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)	
Required, or Elective	Elective	
Course Description	This course explores advanced concepts in pavement materials, focusing on the characterization, selection, and performance of asphalt materials. Students will learn state-of-the-art methods for designing asphalt mixes, evaluating durability, and optimizing pavement structures for sustainability and longevity in civil infrastructure projects.	
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. Analyze advanced properties of pavement materials and asphalt mixes using characterization techniques to address performance challenges. K1	SO1
	CLO2. Evaluate asphalt durability and distress mechanisms through performance testing and critical interpretation of experimental data. S2	SO3
	CLO3. Critique research papers on pavement engineering, demonstrating ethical communication and collaborative discussion skills. S3	SO4
	CLO4. Design sustainable asphalt mixes (e.g., Superpave, recycled materials) using modern tools, evaluating societal, environmental, and economic impacts. S4	SO5
	CLO5. Collaborate autonomously in teams to manage tasks, research, or projects with professional integrity. V1	SO6
	CLO6. Propose optimized pavement systems integrating structural analysis, sustainability, and lifecycle assessment. V2	SO7
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 3 Investigate scientific research problems independently or through teamwork using critical thinking, appropriate techniques, advanced tools, and management principles. SO 4 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. 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.	

	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.	
Topics Covered	<b>List of Topics</b>	
	<b>Related CLOs</b>	
	1. Properties and Characterization of Pavement Materials	<b>CLO 1</b>
	2. Asphalt Binder Selection and Modification	<b>CLO 1,2</b>
	3. Aggregate Selection and Gradation	<b>CLO 1,2</b>
	4. Asphalt Mix Design Methods (Marshall, Superpave, etc.)	<b>CLO 2,5</b>
	5. Performance Testing of Asphalt Mixes	<b>CLO 3</b>
	6. Durability and Distress Mechanisms in Asphalt Pavements	<b>CLO 3,5</b>
	7. Sustainable and Recycled Materials in Asphalt Mixes	<b>CLO 2,5</b>
8. Pavement Design and Structural Analysis	<b>CLO 5</b>	
9. Quality Control and Assurance in Asphalt Construction	<b>CLO 6</b>	
Textbook(s) and Other Required Material	•James G. Speight, Asphalt Materials Science and Technology 1st Edition, 2015	
Grading System	Project	10%
	Assignment	10%
	Midterm 1	20%
	Midterm 2	20%
	Final	40%
Instructors	Appointed Faculty	
Date of Review	November, 2024	