College of Engineering

Department of Civil Engineering

CE 536 Advanced Geometric Design of Highways

Credit and Contact hours	3 / 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Elective
Course Description	Design designations and criteria. Integration between horizontal and vertical alignments. At-grade intersections; types and design elements. Interchanges: types and design elements. Design of parking facilities and appurtenances. Surface Drainage. Safety considerations.
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. Recognize the concepts of highway geometric design and how to design and integrate the vertical and horizontal alignments of highways taking into consideration various factors that control the design. K1	**SO1**
CLO2. Develop design criteria and inputs needed for highway design. S1	**SO2**
CLO3. Design highway cross section elements and vertical and horizontal alignments using Autocad based software. S2	**SO3**
CLO4. Evaluate the performance of existing highways in real life projects. S3	**SO4**
CLO5. Develop a system for designing highway in accordance with the available codes and specifications using ethical and professional practices. 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 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 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 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

List of Topics	Related CLOs
1. Introduction to CE 536	**CLO #,#,#**

	2. Highway Functions & Design controls	**CLO 1**
	3. Sight distances	**CLO 1,2**
	4. Highway Vertical Alignment	**CLO 1,3**
	5. Highway Horizontal Alignment	**CLO 1-3**
	6. At grade intersection	**CLO 1-3**
	7. Interchanges	**CLO 1-3**
	8. Highway location and planning	**CLO 1-5**
	9. Highway facilities (Bridges, parking lots)	**CLO 1-3**
	10. Drainage	**CLO 1-4**
	11. Highway crossings	**CLO 1-5**
	12. Design Products & Process	**CLO 1-5**
Textbook(s) and Other Required Material	• "Highway Design Manual", MOT/MOMRA, Saudi Arabia. • AASHTO standards and manuals “green book” , “roadside desing” • Mannering, F. L., & Washburn, S. S. (2020). Principles of highway engineering and traffic analysis. John Wiley & Sons.	
Grading System	Project Mid-term Exam Final Exam	30% 30% 40%
Instructors	Dr. Ali Abdullah D Alsahli	
Date of Review	November, 2024	