

1. CEE 4640 (5640) – Highway Engineering
2. Course credit hours: 3
 Contact hours per week: 3
 Credit category: Engineering Topics (Significant Design)
3. Course coordinator: Steven M. Click
4. Textbook: *A Policy on Geometric Design of Highways and Streets*, Current Edition. The American Association of State Highway and Transportation Officials, Washington, DC

5. Course information:

2020 Catalog description	Theory and practice of highway geometric design; highway plans; construction practices; computer applications to highway design.
Prerequisite(s)	CEE 3610
Course type	Selected Elective

6. Course instructional outcomes:

Course Outcome No.	Course Outcome (CO)	ABET Student Outcome
CO1	Be familiar with the “Green Book” and able to use it as a reference for determining appropriate controls for the design of streets and highways	1
CO2	Understand sight distance for stopping, passing, and avoiding an obstacle	1
CO3	Understand the process for designing vertical curves, and be able to determine the layout of a vertical curve by locating critical points like the PVC, PVI, PVT, and stations within the curve	1, 2
CO4	Understand the process for designing horizontal curves, and be able to determine the layout of a horizontal curve by locating critical points like the PC, PI, PT, and stations within the curve	1, 2
CO5	Understand the process for designing roadway cross-sections	1, 2
CO6	Understand the process for intersection design, and be able to determine the layout of intersection elements like curb lines, stopbar locations, and required widths	1, 2
CO7	Be familiar with different types of interchanges, and understand the process for selection of an interchange type given expected conditions	1, 7
CO8	Be familiar with other design issues, such as determination of cut and fill, evaluation of drainage needs, and the design of parking facilities	1, 7

ABET criterion 3 Student Outcomes addressed by this course:

SO No.	Student Outcome (SO)
3.1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
3.2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3.7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

7. Course topics:

1. Introductory Topics – Introduction, Factors Influencing Design, Sight Distance
2. Roadway Design – Vertical Curves, Horizontal Curves, Cross Sections
3. Design of Intersections and Interchanges
4. Other Design Issues – Parking Lots, Drainage, Earthworks
5. Special Topics – Professional Registration, Continuing Education, Invited Speakers
6. Group Design Projects and Presentations
7. Exams

Program criteria (curriculum) addressed by this course:

1. Apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science
2. Analyze and solve problems in at least four technical areas appropriate to civil engineering
3. Design a system, component, or process in at least two civil engineering contexts

8. Additional topics, assignments, or requirements for dual-level (4000/5000) course:
Graduate students are required to complete all design projects individually instead of in teams, to prepare and give a course lecture as a team, and to complete additional test questions.

9. Date: 07/16/2020