

CEE 4640 – HIGHWAY ENGINEERING

Elective Course

Catalog Description:

CEE 4640 / 5640 – Highway Engineering. Lecture 3. Credit 3. Theory and practice of highway geometric design; highway plans; construction practices; computer applications to highway design. Prerequisite: CEE 3610

Math & Basic Sciences:	0 Credits	Course Coordinator:	Steven M. Click
Engineering Topics:	3 Credits	Contains Significant Design:	Yes
General Education:	0 Credits	Updated:	2014-06-11
Other:	0 Credits	Specify Type if Other:	

Text Book(s) and Supplemental Material(s):

A Policy on Geometric Design of Highways and Streets, Current Edition. The American Association of State Highway and Transportation Officials, Washington, DC.

Course Goal(s):

The goal of CEE 4640 / 5640 – Highway Engineering is to introduce students to the theory and practice of roadway design.

Instructional Outcomes for the Course:

Students should...

1. 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.
2. Understand sight distance for stopping, passing, and avoiding an obstacle.
3. 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.
4. 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.
5. Understand the process for designing roadway cross-sections.
6. Understand the process for intersection design, and be able to determine the layout of intersection elements like curb lines, stopbar locations, and required widths.
7. Be familiar with different types of interchanges, and understand the process for selection of an interchange type given expected conditions.
8. Be familiar with other design issues, such as determination of cut and fill, evaluation of drainage needs, and the design of parking facilities.

Criterion 3 Student Outcomes addressed by this Course:

- c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d) An ability to function on multidisciplinary teams
- e) An ability to identify, formulate, and solve engineering problems
- g) An ability to communicate effectively

- h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Program Criteria addressed by this Course:

- Apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science, consistent with the program educational objectives
- Apply knowledge of four technical areas appropriate to civil engineering
- Design a system, component, or process in more than one civil engineering context

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

Additional Topics/Assignments for dual-level (4000/5000) courses:

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.