Civil and Environmental Engineering (CEE) 450

HIGHWAY LOCATION AND GEOMETRIC DESIGN

Spring 2008

Class Information: Lecture: TR 11:15 to 12:30 PM – Hasbrouck 138
3 Credits
Prerequisite: CEE 310

Instructor: Dr. Michael A. Knodler Jr.
216 Marston Hall
545-0228 (home: 284-0003)
mknodler@ecs.umass.edu

Office Hours: TR 1:00 to 3:00 PM
M 10:00 AM to 12:00 PM
By Appointment
By E-mail

Catalog Description

Highway location and geometric design principles for streets and highways with emphasis on roadway safety. Includes state-of-the-art design policies and current research findings. AutoCAD and transportation design computer software used for class assignments and the class project.

Course Objectives and Outcomes

The primary objective of this course is to introduce students to geometric design principles for streets and highways. Over 40,000 people are killed each year on United States roadways, many of which could be prevented with improvements in geometric features. State-of-the-art design policies and current research findings will be presented throughout. Desired outcomes of the course include, but are not limited to, the following:

- Obtain an understanding of the different elements of the roadway geometric design process;
- Learn basic techniques for designing roadway and intersection facilities. These
techniques include functional classification, route selection, design controls, driver elements, horizontal and vertical curvature, cross sections, and sight distance;

- Apply the principles of roadway design at the preliminary design stage, including the preliminary route layout, identification of alternative routes, detailed design of alignment curves and tangent segments, elevation and design of major drainage features, cross-section elements and roadside features, computation of earthwork quantities, intersection design elements, and preparation of a design report.

AutoCAD and transportation design computer software used for class assignments and the class project; however, this course is not intended to be a course on computer software.

ABET Content: Engineering Science 33%; Engineering Design 67%

Required Text:


Additional Resources:


*Highway Capacity Manual (HCM).* Transportation Research Board (TRB), Washington D.C., 2000


Handouts/Software

The handouts and software used in this course are copyrighted. Handouts shall not be copied unless the instructor expressly grants permission. Under no circumstances shall software be copied or used outside of class requirements or for personal activities.

Class Attendance Policy

Students are expected to attend each class and lab and arrive on time. Each student is responsible for the material covered and for all assignments made in class whether or not he or she attends the class. Attendance will be considered in assigning final grades.

Students are responsible for taking exams at the scheduled times, to know the location that the exam will be given, and to make alternative arrangements in advance if a legitimate reason exists for not being able to take an exam. In considering whether to grant an excuse for an absence caused by illness or other extenuating non-academic reasons, faculty have the right to require formal, written documentation, within the limits of the health care provider's policy. (See Excuses for Health Reasons, under Administrative Policies & Procedures). No make-up exams will be given for un-excused absences.

State law requires that the University excuse any student who is unable to attend classes or participate in any examination or study because of religious observance. Students have the right to make up examinations or study that they miss because of religious observance without any adverse or prejudicial effects. Therefore, students have an obligation to inform their instructor, in advance, of the days on which they may be absent for religious reasons. Students should inform their instructor in writing of the days they will be absent as early in the semester as possible and always prior to the day(s) on which they will be absent for religious reasons.

Statement on Plagiarism

The student will be required to use published and unpublished literature in preparing class assignments and laboratory reports. Literature includes books, reports, papers, articles, speeches/oral presentations, interviews, and Internet Web Sites. Plagiarism in any form will not be tolerated and will result in a grade of zero. Plagiarism includes, but is not limited to, the following:

- Using thoughts or words of others and representing them as your own, including copying text from other sources without attribution. Direct quotation of other source material may be used if it is highlighted by quotation marks and/or italic font, and the source is acknowledged. Plagiarism also includes the description of concepts or ideas which you have taken from other sources, not copied word for word, but for which you do not attribute the source.
- Copying of lab reports or papers prepared by other students, regardless of the source.
- Submitting a paper, and representing it as your own work, which was prepared by another.
- Downloading text and figures from an Internet Web Site which you do not attribute the source.
Homework/Lab Reports/Project Due Date Policy

All class assignments are due on the day and time assigned. **Late assignments will NOT be accepted for grade.** Assignments must be professional in nature and should be legible and organized.

Outcome Measures and Assessment: (Grading)

Your grade for this course will be based on the following:

- **2 - One Hour Exams** 40 percent
  (feedback on the comprehension and application of traffic engineering principles).

- **Homework/Quizzes** 30 percent
  (feedback on comprehension of lectures and reading assignments; state-of-the-art analysis; communication)

- **Project/Oral Presentation** 25 percent
  (measure ability to apply technical material to the solution of a real-life problem in a group setting; communication including a detailed written report and oral presentation)

- **Participation/Attendance** 5 percent

Course Outcomes and Assessments Addressed in CEE 450:

1. Ability to apply knowledge of mathematics, science, and engineering

2. Ability to define a problem, conduct experiments, analyze and interpret data, and apply statistical methods

3. Ability of function on multi-disciplinary teams

4. Ability to communicate ideas effectively

5. Understanding of civil engineering decisions on society

6. Understanding of professional and ethical responsibility

7. Recognition of the need for, and an ability to engage in life-long learning

8. Knowledge of codes, contract documents, standards and contemporary issues

9. Understanding of the role of research in solving engineering problems