

**CE 466/ 566 Highway Geometric Design
Fall 2007 Course Syllabus**

Catalog Description: (3) CDT. Study of geometric elements of streets and highways, with emphasis on analysis and design for safety. Prerequisites: CE 363. Graduate-level requirements include a research paper or project.

Course Objectives: This course will provide students with an understanding of the basic principles and techniques of highway design. This will include laying out potential routes, design of the alignment and intersections, and evaluation of earthwork requirements. The student should be able to understand and apply these principles to highway design problems. The student should also be able to use existing computer tools to generate and analyze designs. Upon completion, students should be prepared to work in the field of highway design.

Instructor: Dr. Mark Hickman
Civil Engineering Building Room 214B, Phone 626-9420
E-mail: mhickman@engr.arizona.edu
Office hours: Monday 2-5 pm; other times by appointment.

Class Hours: Tuesday and Thursday 2:00-3:15 pm, CE 201
Software tutorial sessions will be scheduled as needed during the semester.

Textbook: American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004.

Course URL: <http://www.u.arizona.edu/~mhickman/ce466.html>

Grading System: 30% Homework / design projects, 20% Exam 1, 20% Exam 2, 30% Final Exam
A = above 90%; B = 80 to 89%; C = 70 to 79%; D = 60 to 69%; E = below 60%.

For graduate students, 20% of the grade will be based on the semester project; the percentages above are adjusted proportionally.

Course Requirements: The course includes two examinations during the semester and a final examination. About 9 homework assignments (problems and design exercises) are also required during the semester. Homework and solutions will be posted on the course web site. Each homework is worth 20 points toward the total homework grade. Late homework will have the following penalties: up to 1 class late: 5 points; up to 1 week late: 10 points; after 1 week: no credit.

The homework includes computer exercises using standard highway design software. Students will have access to MicroStation V8 and INROADS software, either for their own computers or within the computer labs in the Civil Engineering building. Those with access to other software (AutoCAD, GEOPAK, etc.) should feel free to use that software; however, the instructor may not be able to advise students working with that software.

Homework Policies: Working on homework in groups of two is permitted; larger groups are not permitted. If two people work together, a single project or assignment should be turned in, with both names clearly indicated on the assignment. There will be higher expectations for work done in pairs, so more points may be taken off of a group assignment for the same error. This reflects the expectation that groups of two can double-check each other's work.

Copying another student's work *without attribution, including copying of any part or the whole of computer files*, is considered plagiarism. It will be prosecuted as a violation of the University of Arizona Student Code of Conduct, in accordance with the Code of Academic Integrity. This code is published at <http://w3.arizona.edu/~studpubs/policies/cacaint.htm>. The instructor assumes that students are familiar with the University's Code of Conduct and the Code of Academic Integrity; it is the student's responsibility to be familiar with these policies.

Graduate Students: Graduate students will need to complete an additional project or research paper during the semester. Selection of the project or research topic should be in consultation with the instructor. The following milestones are *guidelines* for completion of the project:

- September 27: 1-page description of project or research subject to instructor
- October 25: 1-page progress report to instructor
- November 20: 1-page progress report to instructor
- December 7: Final report due to instructor

The project will count as 20% of the semester grade for graduate students.

Course Outline

Topic	Reading in Text
Introduction and roadway function	Chapter 1
Design controls: vehicles and drivers	Chapter 2
Design controls: speed, volume and access	
Route layout and selection criteria	Supplemental
Exam 1, tentatively September 27	
Sight distance, horizontal and vertical alignment	Chapter 3
Cross-sections and drainage	Chapter 4
Earthwork calculations	Supplemental
Exam 2, tentatively November 1	
Intersection design features	Chapter 9 and Supplemental
Intersection sight distance	
Design of other traffic facilities	Supplemental
Final Exam, Thursday December 13, 2-4 pm	

Additional References

Krishnan, G.V., and J. E. Taylor, Harnessing MicroStation V8, Delmar Publishers, 2003.

INROADS Tutorial, with software (on line).

Schoon, J.G., Geometric Design Projects for Highways: An Introduction, 2nd Edition, American Society of Civil Engineers Press, 2000.

Roadside Design Guide, 3rd Edition, AASHTO, 2006 (revision).

AASHTO Strategic Highway Safety Plan, on-line at <http://safety.transportation.org/> (2007).

J. Pline (ed.), Transportation Engineering Handbook, 5th Edition, Institute of Transportation Engineers, Prentice Hall, 1999.

Manning, F., W. Kilareski, and S. Washburn, Principles of Highway Engineering and Traffic Analysis, 3rd edition, John Wiley and Sons, 2005.

Highway Capacity Manual 2000 (HCM 2000), Transportation Research Board, 2000.