

**CE 466/ 566 Highway Geometric Design
Fall 2010 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, evaluation of earthwork requirements, and safety considerations. 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 evaluate these designs. Upon completion, students should be prepared to generate basic highway designs.
- Instructor: Dr. Mark Hickman
Civil Engineering Building Room 214B, Phone 626-9420, mhickman@email.arizona.edu
Office hours: Tuesday 1-3, Thursday 3-5 pm; other times by appointment
- Class Hours: Tuesday and Thursday 11:00-12:15 pm, Chavez 104
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. Other materials will be available through D2L.
- Grading System: 45% Homework / design projects, 25% Mid-term Exam, 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 a mid-term examination and a final examination. About 9 homework assignments (combination problems and design exercises) are also required during the semester. Homework assignments and solutions will be posted in D2L. 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 highway design software. Students will receive tutorials with AutoCAD Civil 3D (2010), MicroStation V8 and INROADS software. Students are free to use other software, but at their own risk.
- 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://dos.web.arizona.edu/uapolicies/>. It is the student's responsibility to be familiar with these policies.
- D2L: Complementing the in-class lectures, some course material will be published through the University's D2L site, at <http://d2l.arizona.edu/>. The D2L site will include extra readings, homework assignments and solutions, and other materials. Students should check the site regularly for course information.

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. Periodic updates on progress during the semester are expected.

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, environmental considerations, and context sensitive solutions	Supplemental
Sight distance, horizontal and vertical alignment	Chapter 3
Mid-term Exam, tentatively Thursday, October 14	
Cross-sections	Chapter 4
Intersection design considerations	Chapter 9
Earthwork	Supplemental
Safety assessment tools	Supplemental
Final Exam, Tuesday December 14, 11 am-1 pm	

Additional References

INROADS Tutorial, with software.

AutoCAD Civil 3D Tutorial, with software.

John Mason (ed.), Urban Street Geometric Design Handbook, Institute of Transportation Engineers, 2008.

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

AASHTO, Highway Safety Manual, 2010.

Transportation Research Board, Access Management Manual, 2003.

Transportation Research Board, Evaluating Intersection Improvements: An Engineering Study Guide, National Cooperative Highway Research Program (NCHRP) Report 457, 2001. On-line at:
<http://www.trb.org/publications/nchrp/esg/esg.pdf>

Transportation Research Board, A Guide to Best Practices for Achieving Context Sensitive Solutions, National Cooperative Highway Research Program (NCHRP) Report 480, 2002.

Institute of Transportation Engineers, Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, ITE Proposed Recommended Practice, 2005.

AASHTO, A Guide for Achieving Flexibility in Highway Design, May 2004.

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

Federal Highway Administration (FHWA), Interactive Highway Safety Design Model, on-line at
<http://www.tfrc.gov/safety/ihsdm/ihsdm.htm>

Federal Highway Administration (FHWA), Safety Analyst, on-line at <http://www.safetyanalyst.org/>

W. Kraft, W. Homburger, and J. Pline (eds.), Traffic Engineering Handbook, 6th Edition, Institute of Transportation Engineers (ITE), 2009.