

**University of Illinois at Chicago  
Department of Civil and Materials Engineering**

**CME 402**

**Geometric Design of Highway Facilities**

**Spring 2007**

**Instructor:** Kouros Mohammadian, Ph.D.

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**Catalog Description:**

Elements of geometric design. Driver, vehicle, and roadway system characteristics. Horizontal and vertical alignment design. Intersection design and operation. Safety effects of geometrics.

**Prerequisites:** CME 302

**Course Objectives:**

This course is intended to provide the student with the following:

1. learn how engineers approach and solve transportation design and operation problems;
2. learn the principles and methods for design of transportation facilities;
3. acquire an understanding of engineer's responsibility in providing safe and affordable transportation facilities;
4. an understanding of current transportation design issues and policies;
5. an understanding of the overall process of transportation design and its role within the wider context of transportation decision-making; and
6. experience in writing and speaking about transportation systems.

**Lectures:** Tue. & Thu. 2:00 - 3:15 p.m. in 1033 ERF

**Grading System:**

Assignments	15%
Project and Presentation	20%
Tests (probably first week of March & April)	30%
Final Exam	<u>35%</u>
TOTAL	100%

No text book is required (see the recommended text below). Lecture notes and PowerPoint slides will be posted online on blackboard ahead of time. Additional readings will be assigned or distributed periodically throughout the term

**Recommended Textbook (homework will be assigned mostly from this text):**

- Fred L. Mannering, Walter P. Kilareski, and Scott Washburn "*Principles of Highway Engineering and Traffic Analysis*", *Third Edition*, John Wiley & Sons, 2005.

**Supplementary References:**

- American Association of State Highway and Transportation Officials (AASHTO), "*Policy on Geometric Design of Highways and Streets*", 4<sup>th</sup> Edition, 2001.
- Wright, P.H. and K. Dixon, *Highway Engineering, 7<sup>th</sup> Edition*, John Wiley & Sons, 2003.
- Illinois Department of Transportation (IDOT), *Road Design Manual*, 1999 and 2002.

- Federal Highway Administration, Manual of Uniform Traffic Control Devices (MUTCD 2003), 2003. <<http://mutcd.fhwa.dot.gov>>
- Turner-Fairbank Highway Research Center, Roundabouts: An Informational Guide, June 2000. <<http://www.tfhrc.gov/safety/00068.htm>>

### **Tentative Lecture Schedule**

This section describes approximately what topics will be covered in lectures. The schedule will likely slip as the term progresses, and as classes are canceled due to holidays.

Note that the schedule and each section may vary from the organization shown here.

Week 1:	Introduction to Transportation Engineering Fundamentals of Human Factors
Week 2:	Road Vehicle Performance Introduction to Geometric Design
Week 3:	Design Standards Principles of Highway Alignment
Week 4:	Horizontal Alignment Development of Superelevation
Week 5:	Vertical Alignment Sight Distances for Geometric Design
Week 6:	Cross Section Elements Cut and Fill and Earth Work
Week 7:	Mid-Term Test 1 Highway Location
Week 8:	Intersection/Interchange Layout and Design Intersection Sight Distance
Week 9:	Introduction to Pavement Design and Management Pavement Types
Week 10:	Flexible Pavement: Stress and Deflection Flexible Pavement: Design
Week 11:	Mid-Term Test 2 Rigid Pavement: Stress and Deflection
Week 12:	Rigid Pavement: Design Pavement Performance and Evaluation
Week 13:	Student Project Presentations
Week 14:	Pavement Maintenance and Rehabilitation