Southern Illinois University Edwardsville  
Department of Civil Engineering  
CE 575: Advanced Geometric Design of Highways  
Syllabus

TEXTBOOK: A Policy on Geometric Design of Highways & Streets  
AASHTO, 2004 Ed. Telephone: (202) 624-5800  
www.transportation.org

COURSE OBJECTIVES:  
This course serves as an introductory course in the fundamentals and concepts of  
highway geometric design for Civil Engineering graduate students. The course  
provides a broad overview of the latest policy on geometric design of highways and  
streets and exposes students to the tools and concepts needed to practice highway  
design in the field of civil engineering. Upon the completion of this course, students  
will:

- Be able to undertake advanced work in the area of highway design
- Be aware of and able to understand policies on the geometric design
- Be able to use the tools needed for highway geometric design

PREREQUISITIES  
CE 376 Introduction of Transportation Engineering

Schedule of Topics:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hierarchy of Movements, Functional Classification of Highways, Design Vehicles &amp; Turning Paths, DHV, Design Speed, Access Management &amp; Control</td>
</tr>
<tr>
<td>2</td>
<td>Cross Section Elements, Cross Slopes, Typical Sections of Various Highways, Curb &amp; Gutter Design, Sidewalk Design, Laying Grades</td>
</tr>
<tr>
<td></td>
<td>Homework 1</td>
</tr>
<tr>
<td></td>
<td>Reading Assignments: Chapters 1 &amp; 2</td>
</tr>
<tr>
<td>3</td>
<td>Horizontal Alignment with Super-elevation curves, with Transitional Control &amp; Design, Two-centered and Three Centered Curves, Side Friction factors, Methods of Super-elevation, Maximum Super-elevation rates</td>
</tr>
<tr>
<td>4</td>
<td>Complex Vertical Curve Design, Reverse vertical Curves, Combination of HC and VC and Alignment Coordination, AASHTO Stopping Sight Distances, Longitudinal Grades, Sight Distance at under-passes (bridges), Vertical Clearances</td>
</tr>
<tr>
<td></td>
<td>Homework 2</td>
</tr>
</tbody>
</table>
Reading Assignments: Chapter 3 Related Sections

5  Shoulder and Lane Widening Effects on Crash Rates, Intersection Design, ISD Cases A-F, Operational and Control Measures for Right & left Turn Maneuvers,

6  Warrants for Auxiliary Lanes, Anatomy of Auxiliary Lanes. Divisional Islands, Channelization, Special Intersection Profiles (Intersection Plateau), Minimum Design for U-Turns, High Speed Turns

Homework 3
Reading Assignments: Class Materials, Chapters 4 and 5

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Sight Distances (PSD, SSD, DSD ) and Applications</td>
</tr>
<tr>
<td>8</td>
<td>Mid-Term Examination</td>
</tr>
<tr>
<td>9</td>
<td>Rail Grade Crossings, RR Preemption, Rail-Grade Crossing Sight Distances, Earthwork Operations, Areas of Cross Sections, Volume of Earthwork by Average End Area, Three-level and Five-Level Section Methods (Prismoidal), Plan &amp; Profiles</td>
</tr>
</tbody>
</table>

Begin Term Project

10   Roadside Safety Design, Clear Zones, Roadside Barriers

Homework 4

11   Roundabout Design, Bikeway & Pedestrian Facilities Design

Homework 5

12   Interstates (Freeways) Ground level, Interstates (Freeways) Elevated and Four-Roadway Systems, Typical Sections

13   Interchanges Type Determination and Comparison (Road User Benefit Analysis) Interchange Design, Lane Balancing, Ramp Junctions

14   Climbing Lanes and Design, Emergency Escape Ramp and Design

15   Lane Management, (HOV and Reversible Lanes) Lane Management, (HOT Lanes), Ramp Control and Management

16   Term Project Due and Final Examination