Class Information: Lecture: 12:05, MWF  
Lab: Various F  
3 Credits  
Prerequisites: CEE 370, CEE 574, Instructor’s Consent

Instructor: Dr. David A. Noyce

Office Hours: 8:00 to 9:30 MW  
By Appointment  
By E-mail

Class Web Site: TBA

Catalog Description

Advanced topics in transportation safety including both motorized and non-motorized modes. The course is divided into three modules. Topics in the first module include safety management systems, human factors, data needs and limitations, identification of hazardous locations, diagnosis of problems, and development of countermeasures. The second module explores the road safety audit process and the methodologies of conducting an audit. The third module includes topics in motor vehicle accident reconstruction and cause analysis.

Course Objectives and Outcomes

The primary objective of this course is to introduce graduate students to topics in traffic safety engineering. Over 42,000 people are killed each year on United States roadways. The goal of transportation safety engineering research is to reduce this number substantially. State-of-the-art computer applications and current research findings will be presented throughout the course.
Text


Resource Materials


13. Computer software manuals, Transportation Research Records, and Research Reports assigned by the instructor.
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 in borderline cases.**

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.**

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.

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The student will be required to use published and unpublished literature in preparing class assignments and laboratory reports.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 the thoughts or words of others and representing them as your own. This includes the copying of 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 individual or organization.
- Downloading text and figures from an Internet Web Site which you do not attribute the source.

The student will be instructed on methods for proper referencing of cited literature using Transportation Research Board (TRB) format (see TRB Web Site).

Evaluation
Final grades for the course will be based on the overall course average using the following guide:

<table>
<thead>
<tr>
<th>Percent</th>
<th>Accomplishment Level</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 - 100</td>
<td>Superior</td>
<td>A</td>
</tr>
<tr>
<td>88 - 89</td>
<td>Excellent</td>
<td>AB</td>
</tr>
<tr>
<td>80 - 87</td>
<td>Proficient</td>
<td>B</td>
</tr>
<tr>
<td>78 - 79</td>
<td>Good</td>
<td>BC</td>
</tr>
<tr>
<td>70 - 77</td>
<td>Acceptable</td>
<td>C</td>
</tr>
<tr>
<td>68 - 69</td>
<td>Fair</td>
<td>CD</td>
</tr>
<tr>
<td>60 - 67</td>
<td>Poor</td>
<td>D</td>
</tr>
<tr>
<td>Below 60</td>
<td>Unacceptable</td>
<td>F</td>
</tr>
</tbody>
</table>
University Academic Honesty Policy and Guidelines will be followed.

Outcome Measures and Assessment: (Grading)

Your grade for this course will be based on the following: (TOTAL POINTS = 1000)

2 - One Hour Exams 300 points
(feedback on the comprehension and application of traffic engineering principles).

Homework (~6)/Quizzes 300 points
(feedback on comprehension of lectures and reading assignments; state-of-the-art analysis; communication)

Project/Oral Presentation 300 points
(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)

Lecture 100 points
(understand elements of the profession and current topics in transportation safety)
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Objectives</th>
<th>Assignment</th>
</tr>
</thead>
</table>
| 1    | Introduction to Course | 1. Introduce professor and students  
2. Understand the Syllabus  
3. Introduce transportation safety | Review NHTSA web site; 2000 Traffic Safety Facts (www.nhtsa.org). Select 1 item to present to the class |
| 2    | Safety Plans | 1. Understand what safety facts are available  
2. List and describe AASHTO’s Strategic Highway Safety Plan | Assignment 1 - Written response to questions on handout |
| 3    | Human Factors | 1. Define Human Factors  
2. List the objectives of traffic signals  
3. Explain how drivers and traffic signals interact  
4. Explain color vision and deficiencies  
5. Describe how human factors affects transportation safety | --- |
| 4    | Road Safety Management Systems | 1. Describe the understanding associated with a good safety management system  
2. Explain the multi-causal dynamic systems approach to safety  
3. Present and explain the crash v. accident debate  
4. Explain ‘regression to the mean’ and its significance to safety management | --- |
| 4    | Roundtable Discussion | 1. List five road safety improvement strategies  
2. Critique the elements of a road safety plan | Assignment 2 |
| 5    | Non-motorized Safety | Guest Speaker – | |
| 5    | Safety Data Needs and Limitations | 1. List the data needs for safety analysis  
2. List, describe and critique the major elements of crash reporting forms  
3. Explain the data limitation in crash reporting | |
| 6    | Hazardous Road Locations | 1. Describe methods for identifying hazardous road locations  
2. Draw and interpret a collision diagram  
3. Use a collision diagram to diagnose a traffic/crash problem | Review Chapters 1 through 7 in Ogden  
Review Intersection Safety Handout |
| 6    | Selecting Crash Countermeasures | 1. Discuss and present the NHTSA Economics of Crash  
2. Describe the process for selecting countermeasures  
3. Describe the criteria for selecting countermeasures  
4. Critique the countermeasure selection process | Assignment 3 |
| 7    |  | 1. Describe the statistical process used in countermeasure data analysis | |
|   | Statistic Interpretation and Analysis of Crash Data | 1. List and describe typical analyses used in safety data analysis  
2. Identify issues in traffic safety data analysis | Read papers and handout material |
|---|---|---|---|
| 8 |   | 1. Analyze and critique safety literature  
2. Evaluate safety data using appropriate techniques |   |
|   |   | 1. Apply statistical techniques learned in class discussions |   |
| 9 | Road Safety Audits | 1. Describe the road safety audit process | Assignment 4 |
|   |   | **EXAM 1** |   |
| 10 | Road Safety Audits | 1. List and describe the key elements of a road safety audit |   |
|   | Guest Speaker | 1. Describe the FHWA safety program  
2. Discuss the key elements of the Roadside Design Guide | Student Lecture |
| 11 | Guest Speaker | 1. Discuss the safety elements if the International Scan Tour |   |
|   | Road Safety Audits | ---- |   |
| 12 | Road Safety Audit – Field Analysis | 1. Conduct a Road Safety Audit | Assignment 5  
Assignment 6 |
|   |   | **Student Lecture** |   |
| 13 | Crash Reconstruction | 1. Review Crash Video  
2. Describe the basic information that can be obtained from the roadway surface | Student Lecture  
Student Lecture |
|   |   | 1. Understand basic physics related to crash reconstruction  
2. Calculate speed for various skid, friction, drag, and acceleration scenarios |   |
| 14 |   | 1. Describe the variables involved in jump and flip crashes  
2. Describe the variables involved in pedestrian crashes | Assignment 6  
Assignment 6 |
|   |   |   | Student Lecture |
| 15 | Final Projects | Project Presentations  
Project Presentations - **EXAM 2** – (Take Home) |   |