

Course Number	410 (Undergraduate) 510 (Graduate)
Title	Transportation Safety Analysis
Section	001
CRN(s)	14459 (Undergraduate) 14460 (Graduate)
Credits	4
Design Credits	2
Prerequisite(s)	Senior Standing or Graduate Standing
Days/Time	Monday and Wednesday 12:00 PM to 1:50 PM
Location	SB2 Room 108
Final Exam Day/Time	Thursday, December 8 2005 1230 PM -2:20PM

Course Website	www.cee.pdx.edu/~monserec/
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Instructor	Dr. Christopher M. Monsere, P.E.
Office	119A Science Building 2
Phone	503-725-9746
E-mail	monsere@pdx.edu
Office Hours	Mondays 2-3 PM, Tuesdays 10-11 AM, others by appointment
Mailbox Location	CEE Office, Science Building 2, Room 128

Required Text or Other Materials:
Ogden, K.W. *Safer Roads: A Guide to Road Safety Engineering*. Aldershot, Hants, England; Brookfield, Vt.: Ashgate Publishing, 1996.

- Recommended References/Optional Text/Supplemental Readings & Resources:**
- Hauer, E. *Observational Before-After Studies in Road Safety*, Hauer, E. Observational Before-After Studies in Road Safety. Elsevier Science Ltd. 1997
 - *A Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials, Washington D.C. 2001
 - *Roadside Design Guide*, American Association of State Highway and Transportation Officials, Washington D.C. 2002

Catalog Course Description
Incorporating safety in highway engineering and transportation planning. Includes highway design, operation, and maintenance, as well as human factors, statistical analysis, traffic control and public policy. Design concepts of intersections, interchanges, signals, signs and pavement markings; analyzing data sets for recommendations and prioritization; principles of driver and vehicle characteristics in relation to the roadway.

Design Content
The course contains design concepts of transportation infrastructure and the final class project involves design elements. 50% of course elements are related to design.

Course Statement

Each year, 42,000 people are killed on our nation's highways: the equivalent of one major airline disaster every day. Forecasts indicate that more people, driving more miles, in more vehicles, will be on our highways in the future. Given current trends, there is a possibility that without significant action, fatalities from motor vehicles crashes may start to increase reversing a long declining trend. In addition, while there has been substantial improvement in highway safety in the last 50 years in the United States, we are far behind European, Australian, and Canadian officials in developing a "safety culture" among engineers, government officials, and the motoring public.

Improvements in highway safety are often a multidisciplinary approach of engineering, enforcement, education, and emergency services. The focus of this class is on the engineering or planning professional. Highway safety engineering is a specialized field that requires knowledge of highway design, operation, maintenance, human factors, statistical analysis, traffic control, and public policy. Professionals must be familiar with design concepts of intersections, interchanges, traffic signals, traffic signs and pavement markings. They must be able to analyze large data sets and make recommendations and prioritization based on the results. Most importantly, safety engineers must understand the principles of driver and vehicle characteristics as they interact with the roadway.

Course Objectives – Students must demonstrate the ability to:

1. Define highway safety engineering
2. Understand limitations and elements of crash data
3. Identify problem locations on the highway network
4. Identify target crashes and develop potential engineering solutions
5. Apply benefit-cost analysis and rank potential safety improvement projects
6. Evaluate the effectiveness of safety improvement projects
7. Evaluate the quality of safety-related research

Course Evaluation

The course grade will be determined with the following weight for class assignments:

Problem Sets:	30%
Group Project:	30%
Mid-term Exam:	20%
Final Exam:	20%

The course is open to both graduate and undergraduate students, and as such, there will be different expectations for each group. Graduate students are held to higher standards when grading and may be required to do more work on problem sets and exams. I will drop your lowest problem set grade when computing the final grade. If I have made a mistake in recording your grade, please send me an email with subject heading "grade correction" notifying me of my error. I will ask you to show me the corrected assignment. For this reason, save all your returned work!

A grade of incomplete "I" is granted by the instructor *only* with prior approval and consent. Criteria are outlined in the PSU Bulletin. Note that for Civil Engineering Undergraduates the CEE Department requires that junior and senior engineering courses must be completed with a minimum grade of C-, and a student's cumulative PSU GPA must be 2.25 or higher to graduate from the BSCE program.

Course Schedule

#	D	Date	Topic	Reading	Problem Set	Due Dates	
1	M	26-Sep	Introduction	pgs 1-44	Problem Set # 1	3-Oct	
2	W	28-Sep	Crash data elements	pgs 69-95			
3	M	3-Oct	Guest Lecture, Human factors	pgs 45-68	Problem Set # 2	10-Oct	
4	W	5-Oct	Guest Lecture, Accident reconstruction	Handouts			
5	M	10-Oct	Hazardous location identification	pgs 97-117	Problem Set #3	17-Oct	
6	W	12-Oct	Network screening methods				
7	M	17-Oct	Pattern identification	pgs 119-152	Problem Set #4	24-Oct	
8	W	19-Oct	Countermeasures	pgs 153-397 *			
9	M	24-Oct	Guest Lecture, Pedestrian Safety			Project Proposal DUE	
10	W	26-Oct	Benefit/cost analysis	pgs 415-434			
11	M	31-Oct	Mid-term exam		Problem Set #5	7-Nov	
12	W	2-Nov	Predictive crash models	Handouts			
13	M	7-Nov	Predictive crash models		Problem Set #6	14-Nov	
14	W	9-Nov	Predictive crash models				
15	M	14-Nov	Before and after evaluations	pg 435-464, Handouts	Problem Set #7	21-Nov	
16	W	16-Nov	Before and after evaluations				
17	M	21-Nov	Roadside design	Handouts	Problem Set #8	28-Nov	
18	W	23-Nov	Roadside design				
19	M	28-Nov	Review and summary				
20	W	30-Nov	Project Presentations			Final Report DUE	
21	R	8-Dec	Comprehensive Final Exam: Thurs. Dec 8 12:30-2:20 PM				

* Students will find this text useful for class project.

Expectations of the Student

Professionalism

All assignments and class participation should be conducted in a professional manner. Attention to detail on class assignments and communication is important and is part of the learning experience and is included in part of student evaluation.

Attendance

Attendance is strongly suggested. We will do activities in class that will help in your learning of the material that can not be duplicated outside of the classroom. If you are going to miss a class, I suggest that you email me before with a reason stating why you will miss class. If you are on the border for a grade, I will consider attendance.

Late Work

Late work is not accepted. The due date for each assignment is clearly indicated and the work must be turned in at the start of class unless indicated otherwise. Exceptions can only be granted in the most extenuating circumstances.

Computer and E-mail Accounts

Electronic mail is a useful way for us to remain in contact and is the best way to reach me. I will periodically send reminders, hints, and other notices to the class via email. I ask that you include CE410/510 and topic of your message in the subject line (be as specific as possible) when sending me an email. Use proper grammar, spell check, and proof your message. You may be required to submit some of your assignments electronically.

All engineering students should activate their engineering computer account (go to the CadLab in SB2, 169) which will allow them to use engineering computer labs and e-mail. You should activate it *before* the day you need it. If you encounter problems with this account, see the lab attendant, or e-mail: support@cecs.pdx.edu. Please note: the CEE Department regularly sends course announcements, job information, etc. to students' CECS accounts, so if you do not check it regularly, we recommend forwarding your CECS e-mail to whatever e-mail address you use.

Ethics and Professionalism

As future professional engineers you should plan to take the Fundamentals of Engineering Exam and after the required experience, the Professional Engineering Exam (see the Oregon State Board of Examiners for Engineering and Land Surveying at www.osbeels.org). You should also be familiar with the ASCE Code of Ethics (www.asce.org/inside/codeofethics.cfm), which includes the following:

Engineers shall act in such a manner as to uphold and enhance the honor, integrity and dignity of the engineering profession.

The PSU Student Conduct Code prohibits all forms of academic cheating, fraud, and dishonesty. Further details can be found in the PSU Bulletin. Allegations of academic dishonesty may be addressed by the instructor, and/or may be referred to the Office of Student Affairs for action. Acts of academic dishonesty may result a failing grade on the exam or assignment for which the dishonesty occurred, disciplinary probation, suspension or dismissal from the University. The students and the instructor will work together to establish optimal conditions for honorable academic work. Questions about academic honesty may be directed to the Office of Student Affairs (www.ess.pdx.edu/osa/).

Description of Assignments

Problem Sets (30% of final grade)

Problem sets are assigned during the class session and are due the following week at the start of class. Your name, problem set number, and date should appear on the header of each page. Clearly restate the problem and provide your answer. I would greatly appreciate that you staple multiple page assignments. Problem sets will also include a short article for you to read from the current trade or research journals that is relevant to the class. I will provide a few questions to aid in your development of a discussion. Please be thorough, but brief in your responses.

Exams (40% of final grade)

In this class, there will be two exams and each will be worth 15% of your grade. The mid-term will be in-class over materials covered in the first half of the class. The final exam will be a comprehensive in-class exam.

Group Project (30% of final grade)

For the final project, a group of three members is ideal and will either be assigned or self-selected depending on preference. Each team member is expected to contribute and you will have the opportunity on the final exam to provide input on the amount of work done by each team member. The following sub-assignments are part of the final project:

Project Proposal (15% of group project grade)

You should treat this memo like a proposal for your team to do the work. Address your memo to the project client. Describe the topic chosen, introduce your company (team), provide a review of summary of background information, proposed tasks to accomplish the project, expected outcomes, and a brief team resume.

Final Presentation (25% of group project grade)

15-20 minute summary, each team member required to present. Professionals may be invited to listen to your group reports.

Final Report (60% of group project grade)

Include a transmittal letter, cover page and standard headings in the final report. The final report is due during the final presentation period on **11/30/05**. You may submit a draft to me by **11/21/05**, which I will review and provide brief comments. Submitting a draft will allow you to make minor changes prior to the final presentation and report. The expectation is that the draft report will be at least 70-80% complete.

The projects choices are:

<u>Project Number and Title</u>	<u>Area</u>	<u>Project Clients</u>
1 A study of traffic calming alternatives for Harold Avenue between Concord Road and Roethe Road in Clackamas County.	Field Project	Clackamas County, Rick Nys, P.E.
2 A safety analysis of an urban intersection in the City of Portland (tentative)	Field Project	City of Portland, Scott Batson, P.E.
3 A safety analysis of an urban intersection in Beaverton, Murray Blvd. and Tualatin Valley Highway	Field Project	City of Beaverton, Pam Maki, P.E.
3 Development of safety performance functions for Portland area interstate freeway system	Research and Analysis	Oregon DOT, Dr. Monsere
4 Analysis of FARS data for vehicle size and height impacts	Research and Analysis	Dr. Monsere

Resources

Student Groups and Professional Organizations

Participation in student and professional groups can be a valuable part of your education experience. Membership gives students opportunities to get to know fellow students better, meet and network with professionals, collaborate in solving real engineering problems, learn about internship or job possibilities, socialize and have fun. Your fellow students can be a great source of help and guidance in your academic endeavors. Consider becoming active with a student organization, such as the following:

- American Society of Civil Engineers Student Group (ASCE): www.asce.pdx.edu
- Institute of Transportation Engineers Student Chapter (ITE): www.its.pdx.edu/ite/

Most professional organizations have monthly meetings and encourage student participation by providing discounts for lunch and dinner meetings. These meetings provide opportunities to network with potential future employers, learn about scholarships, and increasing your technical knowledge. Take a look at these organizations as a starting point:

- American Society of Civil Engineers (ASCE) Oregon Section: www.asceor.org
- Institute of Transportation Engineers (ITE) Oregon Section: www.oregonite.org
- Society of Women Engineers (SWE) Columbia River Section - www.swe-columbia-river.org
- Structural Engineers Association of Oregon (SEAO): www.seao.org

Research and Learning Opportunities

Transportation is a growing and exciting research area at Portland State University. I invite you to review the research in the Intelligent Transportation Systems Laboratory (www.its.pdx.edu/). Also, every Friday during the semester a Transportation Seminar is presented. All are welcome. The schedule is available at www.cts.pdx.edu

Campus Help

As a PSU student, you have numerous resources at your disposal. Please take advantage of them while you are here. A small sample is listed below:

- CEE Website (includes program info, job listings, etc.): www.cee.pdx.edu
- Career Center: www.career.pdx.edu/
- Center for Student Health & Counseling: www.shac.pdx.edu/
- The Writing Center: www.writingcenter.pdx.edu/
- PSU Disability Resource Center: 435 Smith Memorial Union Note: The PSU Disability Resource Center is available to help students with academic accommodations. If you are a student who has need for test-taking, note-taking or other assistance, please visit the DRC and notify the instructor at the beginning of the term.

Library and Literature Research

With the advent of the Internet it is very tempting to think that all necessary resources for a term project will be available in full text after typing in a few words at Google.com. This is not the case. You will often need to go to the library, use real library search tools and access real books and articles contained in refereed/archival journals.

Be sure to make use of the Vikat library catalog. Go to the PSU library home page at www.lib.pdx.edu/. Also available on the library home page are Full Text Electronic Journals: www.lib.pdx.edu/~bvws/bytitle.html, and a list of on-line Databases: www.lib.pdx.edu/resources/databases/databases.html. Also, try EI Compendex (www.ei.org/ev2/ev2.home) and Lexis-Nexis. Note that access to these databases is free

for PSU students, but you must be using a computer on campus or via a dial-in service. See www.lib.pdx.edu/services/distance/proxyserver.html for instructions on how to gain off-campus access using a proxy server.

Campus Safety

The University considers student safety paramount. The Campus Public Safety Office is open 24 hours a day to assist with personal safety, crime prevention and security escort services. Call 503-725-4407 for more information. For Campus emergencies call 503-725-4404.

Final Notes

- The syllabus is subject to change at the discretion of the instructor as course or other circumstances requires.
- Students with documented disabilities are encouraged to discuss with me arrangements that will enhance their learning in this class.
- Please feel free to discuss with me problems/concerns with your other classes.