

<b>Course Number</b>	450 (Undergraduate) 550 (Graduate)
<b>Title</b>	Transportation Safety Analysis
<b>Credits</b>	4
<b>Prerequisite(s)</b>	CE351 Introduction to Transportation or equivalent
<b>Days/Time</b>	Tuesday and Thursday 8:00 AM to 9:50 AM
<b>Location</b>	EB 92
<b>Final Exam Day/Time</b>	Final Exam Thursday Jun 13 8:00-9:50 EB92
<b>Course Website</b>	D2L
<b>Instructor</b>	Dr. Christopher M. Monsere, P.E.
<b>Office</b>	202K Engineering Building
<b>Phone</b>	503-725-9746
<b>E-mail</b>	<a href="mailto:monsere@pdx.edu">monsere@pdx.edu</a>
<b>Office Hours</b>	By appointment <a href="https://calendly.com/monsere/office-hours">https://calendly.com/monsere/office-hours</a>
<b>Mailbox Location</b>	CEE Office, Engineering Building Room 200

**Required Text or Other Materials:**

Carter D. (editor) (2017) [Road Safety Fundamentals: Concepts, Strategies, and Practices that Reduce Fatalities and Injuries on the Road](#). FHWA-SA-18-003.

Other Reading material provided on D2L site. Lecture notes posted on class web site.

**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.

**Course Statement**

Each year, nearly 37,000 people are killed on our nation's highways: the equivalent of one major airline disaster every day. 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 traffic 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. Traffic safety engineering is a specialized field that requires knowledge of 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 safety data 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. Explain key professional responsibilities in traffic safety engineering including safety management practices (ABET Outcomes F, H).
2. Explain basic concepts in human factors as it relates to transportation safety (ABET Outcomes K, L)
3. Understand and analyze the typical data for safety analysis (primarily crash data) (ABET Outcomes B, K).
4. Apply predictive engineering analysis techniques to evaluate design alternatives (ABET Outcomes C, K, L).
5. Evaluate the effectiveness of safety improvement projects (ABET Outcomes C, K, L).
6. Produce a report documenting a safety investigation of an identified location including an analysis of alternatives (ABET Outcomes C, D, G, K).

## **Course Evaluation**

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

### *Problem Sets (15% of final grade)*

Problem sets are assigned during the class session and are due the following week at the start of class. Problem sets may also include a short article for you to read from the current trade or research journals that is relevant to the class. Please be thorough, but brief, in your responses. All writing must be your own.

### *Safety Investigation (25% of final grade)*

We will work with the City of Portland to study safety performance at locations on the City's high crash network. As part of the project, you will work in teams to make recommendations to improve the safety of the study locations. A final poster and report is required.

### *Exams (60% of final grade)*

In this class, there will be two exams and each will be worth 30% 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.

A grade of incomplete "I" is granted by the instructor *only* with prior approval and consent. Criteria are outlined in the PSU Bulletin.

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.

Grades will be posted in D2L for your review. If we 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!

### *Late Work*

The due date for each assignment is clearly indicated and the work must be turned in at the start of class unless indicated otherwise. Late assignments will be penalized between 5% and 10% of the total points (decided on case-by-case basis). There will be no credit if solutions have been posted.

## **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.

### *Ethics*

As future professional engineers should be familiar with the ASCE Code of Ethics (<https://www.asce.org/code-of-ethics/>), 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. 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.

### *Calculator*

For exams, only CEE Department FE approved calculators allowed.

### *D2L*

Check the class site regularly for updates, posting, and lecture notes. Homework assignments and due dates will be clearly communicated here.

### *Student Parents*

If child-related issues arise that prevent you from attending class, please contact me to discuss possible solutions.

### *Accommodations*

If you have accommodations, please contact me to make sure that I have received a faculty notification letter and discuss your accommodations. Students who need accommodations for tests are expected to schedule their tests to overlap with the time the class is taking the test. If the testing center is full, CEE has space available. Please fill out our [request form](#).

### Course Schedule

Wk	D	Date	Topic	Lecture
1	T	2-Apr	Introduction	1
2	R	4-Apr	Human Factors	2
3	T	9-Apr	Crash and Related Data	3
4	R	11-Apr		
5	T	16-Apr	Guest Lecture – Collision Reconstruction	
6	R	18-Apr	Safety Analysis Fundamentals	4
7	T	23-Apr	Guest Lecture – PBOT VZ and Project List	
8	R	25-Apr	Site Investigation Techniques and Principles	5
9	T	30-Apr	Countermeasures and CMFs	6
10	R	2-May	<b>Mid-term exam</b>	
11	T	7-May	Predictive crash models (HSM)	7
12	R	9-May		
13	T	14-May	Network Screening	8
14	R	16-May		
15	T	21-May	Economic Analysis	9
16	R	23-May		
17	T	28-May	No class or guest lecture	
18	R	30-May	No class or guest lecture	
19	T	4-Jun	Before and After Analysis	10
20	R	6-Jun	Final Poster Session	
	R	13-Jun	<b>Final Exam Thursday Jun 13 8:00-950 EB92</b>	

### 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! Find the current list:

<http://www.pdx.edu/cee/student-groups>

#### 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.): <http://www.cee.pdx.edu/>
- Career Center: <https://www.pdx.edu/careers/home>
- Center for Student Health & Counseling: <https://www.pdx.edu/shac/center-for-student-health-and-counseling>
- If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment. [drc@pdx.edu](mailto:drc@pdx.edu), <https://www.pdx.edu/drc>.

#### 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.

### Final Notes

- The syllabus is subject to change at the discretion of the instructor as course or other circumstances requires.
- Please feel free to discuss with me problems/concerns with your other classes.