

CE 462 ROAD SAFETY ENGINEERING

Elective Course

Spring 2009

Instructor: Gokmen Ergün

Course Data: Hours: TTW 232 Rooms: M1171, M1171, M2171

Course Description (2009 Catalog):

CE462 Road Safety Engineering

(3+0+0) 3

The global and national importance of the problem. Accident studies. Role of human, vehicle and road factors in road safety. Operation, control and management of highway and street networks for safety. Safety improvement programs. Relationship among highway design elements and safety. Safety evaluation methods for countermeasures. Evaluation of effectiveness and benefit/cost of improvement programs. Future research needs.

Course Objectives: This course is designed to teach seniors the techniques for providing a safe and efficient movement of people and goods. The specific objectives are:

1. Define highway safety problem
2. Learn how to interpret accident data
3. Identify high accident locations
4. Learn how to develop countermeasures
5. Evaluate safety improvement projects
6. Learn methods of evaluation for safety monitoring

Textbook:

PIARC, *Road Safety Manual*, R2ute, Cedex, France, 2006.

Ref. Books and Material:

Elvik, Rune and Truls Vaa, *The Handbook of Road Safety Measures*, Elsevier, Amsterdam, 2004.

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

Council, F.M., et.al., *Accident Research Manual*, Federal Highway Administration, Report FHWA/RD-80/016, February 1980.

Harwood, D.W., F.M. Council, E. Hauer, W.E. Hughes, and A. Vogt, *Prediction of the Expected Safety Performance of Rural Two-Lane Highways*, Report prepared for U.S. D.O.T. Federal Highway Administration, Report No. FHWA-RD-99-207.

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.

Reports and publications of GRSP, A global partnership for sustainable improvement of road safety in developing and transition countries <http://www.grsproadsafety.org/>

Texas Transportation Institute, *Safety Design and Operational Practices for Streets and Highways*, 1980.

European Transport Safety Council (ETSC)

<http://www.etsc.be/home.php>

International Road Traffic and Accident Database

<http://www.bast.de/htdocs/fachthemen/irtad/>

World Bank Road Safety Site

<http://www.worldbank.org/transport/roads/safety.htm>

A global partnership for sustainable improvement of road safety in developing and transition countries

<http://www.grsproadsafety.org/>

FHWA Safety Core Business Unit <http://safety.fhwa.dot.gov/index.htm>

Research at FHWA Turner Fairbanks Lab <http://www.tfhr.gov/safety/safety.htm>

ASHTO Strategic Highway Safety Plan Guidebooks <http://safety.transportation.org/guides.aspx>

Pedestrian Safety Design Library http://safety.fhwa.dot.gov/fourthlevel/design_p.htm

National Transportation Library www.bts.gov/NTL

TRIS Online <http://ntl.bts.gov/tris>
Melvyl index www.melvyl.ucop.edu

Design Content: The students will be introduced and through home works and term project practice some safety design principles such as:

Safety design principles in road design
Roadside design (barrier and crush cushion design)
Safety principles in intersection design

Computer Usage: Students are encouraged, but not required, to use softwares for data analysis and safety analysis.

Laboratory Sessions: N/A

Class Policies:

There will be one midterm and a final exam. Furthermore there will be homeworks and a term project. The term projects will be presented at a class hour. The weights of the coursework will be as follows:

Midterm exam	= 35%
Homeworks	= 10%
Term Project and presentation	= 15%
Final	= 40%

Contribution of the Course to Program Outcomes:

This course is intended to contribute to the following program outcomes:

- ✓ (a) An ability to apply knowledge of mathematics, science and engineering
- ✓ (b) An ability to design and conduct experiments, as well as to analyze and interpret data
- ✓ (c) An ability to design a system, component, or process to meet desired needs
- ✓ (e) An ability to identify, formulate and solve engineering problems
- ✓ (f) An understanding of professional and ethical responsibility
- ✓ (g) An ability to communicate effectively
- ✓ (h) The broad education necessary to understand the impact of engineering solutions in a global and societal context
- ✓ (i) A recognition of the need for, and ability to engage in life-long learning
- ✓ (k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Course Assessment: Course will be assessed on the basis of the accomplishments regarding the course objectives and the contributions to the program outcomes. The evaluation will consist mainly of the responses from the students, who will provide their comments to various course related questions in the final week of the semester.

Topics:

The nature and dimensions of the road safety problem: International and National Levels;
Safety management systems;
Human factors in road traffic;
Data needs and limitations;
Hazardous road conditions;
Diagnosis of road accident problems;
Development of countermeasures;
Road design;
Intersections; Delineation,
signing and lighting;
Road maintenance and construction;
The roadside;
Traffic management;