

CEGR 6164/8164 / DSBA 6010 / INES 8090: TRAFFIC SAFETY

COURSE SYLLABUS

Instructor

Srinivas S. Pulugurtha, Professor of Civil & Environmental Engineering

Office Hours:

Tuesday/Thursday from 1:00 PM to 2:00 PM (or) by appointment

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Scheduled Class Hours

Tuesday 2:30 PM - 5:15 PM Eastern Standard Time

Scheduled Meeting Room

EPIC 3336

Canvas Site

Syllabus, lectures, assignments & mini-projects details, term project information, data, etc. will be shared on the course Canvas site. Students can access the Canvas site for this course by logging into my.uncc.edu.

Course Description

Data show that more than 34,000 people are killed and 2.4+ million people are injured on roads in the United States every year. The economic cost of these crashes exceeds several billion dollars. The federal, state, and local governments have been spending billions of dollars to enhance safety as well as mobility and improve the quality of life of the general public. Such an effort to enhance safety is often a multidisciplinary approach involving engineering, enforcement, and education (3 Es). The engineering component includes design, operation, and maintenance, as well as human factors, statistical analysis, traffic control and public policy. The safety improvement process involves analyzing large datasets to identify problem areas, prioritization, provide recommendations, and evaluate the effectiveness of improvement projects.

Course Objectives

The objectives of the course are to:

1. educate students about the importance of traffic safety, and,
2. have students develop skills to address safety problems using analytical tools and techniques.

By the end of the course, students are expected to:

1. have a thorough understanding of safety issues,
2. knowledge of crash data elements,
3. have skills to identify safety problems, high crash zones/locations, and potential safety countermeasures,

4. rank and prioritize high crash zones/locations, and,
5. be able to evaluate the effectiveness of safety improvement projects.

Selected References

1. Highway Safety Manual. Federal Highway Administration, Website: <http://safety.fhwa.dot.gov/hsm/>.
2. Evans, Leonard (2004) "Traffic Safety", Science Serving Society, Bloomfield Hills, Michigan.
3. Ogden, K. W. (1996) "Safer Roads: A Guide to Road Safety Engineering", Ashgate Publishing Company, Brookfield, Vermont.
4. Fatality Analysis Reporting System (FARS), National Highway Traffic Safety Administration.
5. Safety Analyst. Federal Highway Administration, Website: <http://www.safetyanalyst.org/>.

Course Outline

1. Introduction
2. Safety, crash, and types of crashes
3. Categories of crashes
4. Measurement of risk - metrics
5. Road design standards
6. Vehicle related characteristics
 - a. Mass and size
 - b. Occupant protection devices
7. Human factors - Driver related characteristics
 - a. Gender and age
 - b. Performance and behavior
 - c. Contributing factors and collision types
 - d. Temporal and spatial distributions
8. Human factors - Pedestrian related characteristics
 - a. Gender and age
 - b. Pedestrian action
 - c. Temporal and spatial distributions
9. Data elements and sources
 - a. Who are involved in crashes?
 - b. Where (spatial distributions) are crashes occurring?
 - c. What are the contributing factors?
 - d. What are the collision types?
 - e. When (temporal variations) are they occurring?
10. Identify problem areas and hazardous locations
11. Measurement of risk, ranking and prioritization
12. Crash prediction and modeling; Quantifying risk
13. Treatments and countermeasures
14. Evaluation of safety treatments and countermeasures
15. Discrete choice modeling

- 16. Case studies
- 17. Other topics (safety conscious planning, road audits, connected & automated vehicles - CAVs, ...)

The instructor reserves the right to modify or make changes to the course outline. Such changes will be notified in advance to the students.

Prerequisite

CEGR 3161 or equivalent or consent of the instructor.

Grading

Assignments	25%	
Exam(s) / Field studies	25%	
Term project	50%	(Written report and in-class oral presentation)
In-class participation	??%	
	<u>100%</u>	

The instructor reserves the right to modify or make changes to the grading criteria. Such changes will be notified in advance to the students.

Class Attendance

Students are expected to attend all scheduled class meetings for the course. Any missed attendance should receive prior authorization from the instructor. It is the student's responsibility to check the Canvas site and obtain information pertaining to class discussions, announcements, lecture notes or handouts distributed during any missed session(s) by contacting the instructor or making necessary arrangements with other students.

Students with unauthorized absences from scheduled class meetings risk having their final score for the course dropped by 0.5 points for every unauthorized absence from class meetings.

Students should turn off all cellular phones, beepers, etc. that make audible sounds when in class. If a student is expecting an EXTREMELY URGENT call or signal, discuss the same with the instructor and other students prior to the start of the class session and obtain the instructor's permission to leave the communication device turned on for the duration of that class session.

Students must refrain from coming late, leaving in the middle of the class, walking in and out of the classroom during the class, or eating in the class as it tends to distract others. If a student has to eat for health reasons, they could do so without disturbing others. Students should clean up and dispose of any litter created while eating at the end of the class period and prior to leaving the classroom. Students coming late to the class, leaving in the middle of the class or walking in and out of class meetings risk having their final score for the course dropped by 0.5 points for every such unauthorized instance.

Submission of Written Work

Students must document all of their work (assignment/mini-project reports, term project report, data used for analysis, source of data used, etc.) as completely as possible. The writing should be as professional in quality as possible. Each submission (even if it is solving a “problem”) must be accompanied with a brief introduction and at least one sentence summarizing what was

learned or the findings. All pages of each submission must be stapled together, be in a legible and well-organized professional format.

Honor Code

All students are expected to follow the honor code - submit only your original work! Students are expected to work individually on their assignments/mini-projects, unless otherwise instructed by the instructor in the assignment/mini-project description. Students may discuss the assignment/mini-project problems (interpretation of the questions, procedures to be used, etc.) in groups. Students may use such discussions to better understand the question or learn alternative methods of addressing the problem. However, the final submission **must** be the result of the student's individual effort unless stated otherwise.

Students must provide proper credit (citations) where appropriate (includes data that the student did not collect but gathered from various sources and used in the analysis).

The instructor reserves the right to request any information that was used but was not documented in submitted assignments/mini-projects or reports. Failure to provide such information will have an effect on the student's course grade.

Penalties for violating standards of academic integrity could be severe and are stated in the "UNC Charlotte Code of Student Academic Integrity".

Late Submission Policy

The assignments/mini-project reports will be due before the start of the lecture period on the dates specified when they are handed out or distributed electronically. In general, students will have at least 7 days to work on each assignment/mini-project. Assignments/mini-projects submitted late will be accepted at the discretion of the instructor and would carry penalties (a minimum penalty of 10% for less than one day; penalty increases with the lateness of submission). Submissions will not be accepted after solutions have been posted or discussed in the class.

Other UNC Charlotte Policies

Disability

UNC Charlotte is committed to access to education. If a student has a disability and need academic accommodations, please provide a letter of accommodation from Disability Services early in the semester. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 or visit their office at Fretwell 230.

Religious Holidays

Any student missing class or lab work because of observance of religious holidays shall be given an opportunity during the semester to make up missed work. Please notify the instructor well in advance (at least a week) of anticipated absences to be assured of this opportunity.

Absences due to Official UNC Charlotte Activity

Students who represent UNC Charlotte at any official extracurricular activity shall have the opportunity to make up assignments, but the student must provide official written notification to no less than one week prior to missed class(es).