CE 552: Traffic Safety, Operations & Maintenance

Course Description:
Engineering aspects of highway traffic safety. Reduction of crash incidence and severity through highway design and traffic control. Accident analysis. Safety in highway design, maintenance, and operation.

Course objectives (course designed to provide students with):

- Developing knowledge, skills, and abilities for planning, managing, and operating safe roadways for all users and modes of travel.
- Analyzing roadway design alternatives, statistical analysis of roadway safety issues, and crash countermeasure selection and evaluation.

Course Outcomes (students should be able to):

- Explain the overall importance of roadway safety for all groups of users
- Recognize and recall key elements, including legislation, of roadway safety policy and professional practice in the United States in the 20th and 21st centuries
- Distinguish between nominal and substantive safety
- Identify and critique different types of available safety data, including relevancy and use cases for different audiences
- Implement methods for predicting crash frequencies
- Implement statistical methods to understand and characterize safety conditions
- Implement methods for predicting crash severities
- Compare and contrast approaches to roadway safety improvement and management
- Conduct benefit/cost analysis for safety improvement projects
- Identify, evaluate, and prioritize potential countermeasures
- Conduct analysis of the effectiveness of safety countermeasures
- Anticipate future advances in road safety
- Compare the Safe Systems approach with traditional Highway Safety Manual and other approaches
- Explain the differences between targeted safety and Safe Systems programs
- Critique safety analyses for potential ethical dilemmas and issues

Course Topics

- Transportation Safety Background History
- Safety Data
- Crash Frequency Prediction
- Crash Severity Prediction
- Network Screening
- Diagnosis, Countermeasure Selection & Economic Appraisal
- Countermeasure Effectiveness Evaluation
- Big Data, Machine Learning & Safety
- Safe Systems
- Human Factors and Non-Infrastructure Safety Improvement Options
- Ethics Analysis