



CE 423 – Traffic Engineering

Code and Name: CE 423 – Traffic Engineering

Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:

- Traffic Engineering by Roger P. Roess, Elena S, Prassas, William R. McShane, 4th Edition, 2011

Other References:

- Highway Capacity Manual (HCM2010) Transportation Research Board, National Research Council, Washington, D.C.
- Thomas R. Currin, Introduction to Traffic Engineering: A Manual for Data Collection and Analysis. Brooks/Cole, Thomson Learning.
- Nicholas J. Garber and Lester A. Hoel, Traffic and Highway Engineering (5th Edition). PWS Publishing.
- *Course handouts: distributed on a regular basis to provide more information on the topic.*

Course Description:

Elements of the road traffic system; traffic flow theory and road capacity analysis; theory and design for signalized intersections; principles and procedures in traffic impact analysis and traffic survey methods.

Pre-requisites: CE421 Transportation Facility Design

Co-requisites: None

Course Learning Outcomes:

With relation to ABET Student Outcomes (From Fall 2019-SOs: 1-7)

1. understand the fundamentals of traffic engineering (4).
2. learn both quantitative and computerized techniques for solving basic traffic engineering problems (1)
3. apply principles of traffic engineering to evaluate, analyze, and design timing plans for signalized intersections (6)
4. demonstrate the capability to write a technical report (3)
5. communicate the results of their solution approach to other engineering professionals (3)

Topics to be covered:

- Basic Concepts, Components of the Traffic System.
- Traffic Stream Characteristics, Fundamental Diagram.
- Traffic Data Collection, Volume Studies
- Speed, Travel Time, and Delay Studies.
- Basic Principle of Probability and Statistics.
- Statistics and Applications in Traffic Engineering.
- Basic Traffic Flow Theory, Shockwave Analysis
- Highway Capacity Analysis, Freeway Weaving Sections/Ramps
- Freeway Management and Control
- Introduction to Intersection Control
- Basic Principles of Intersection Signalization, Webster's Delay Model
- Introduction to Synchro/SimTraffic
- Fundamentals of Signal Design and Timing Phasing Concepts and Dilemma Zone
- Analysis of Signalized Intersections, Highway Capacity Manual
- Signal Coordination, Green bandwidth Concept, Development of Coordinated Timing Plan
- Actuated Signal Control, Actuated Signal Coordination Signal Timing parameters and Detector Placement

Grading Policy:

The grading for the course is: 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, and homework for the remaining 20% that is modified by the course instructor.

