Prerequisite: CIV E 481 – Introduction to Transportation Engineering. Proof of prerequisite required: students not presenting proof of completion for the prerequisite (in the form of a transcript) within one week after the beginning of the semester are subject to automatic disenrollment.

Goals: Introduce the fundamentals of traffic engineering and control, including data collection, analysis, and design of traffic control systems. Discuss traffic engineering studies, traffic flow theory, traffic control devices, traffic signal control, ramp metering, and intelligent transportation systems. Prepare students for further undergraduate coursework in transportation, graduate study in transportation, and entry level employment in transportation engineering.

Course Outcomes: This course is one of many that you will take towards your degree in Civil Engineering. Each course is designed as part of your career development in the Civil Engineering profession. Program outcomes are intended to provide a broad base of knowledge to found your career. However, each course in the curriculum emphasizes particular aspects of that overall body of knowledge. Although other outcomes may also be addressed, this course is intended to have a particular emphasis on the following program outcomes:

Outcome 1: Solve problems in mathematics through differential equations, calculus-based physics, and one additional area of science.
   a. Apply basic knowledge of geometry, trigonometry, calculus, and physics to solve problems in the geometric design of transportation facilities
   b. Apply probability and statistics to solve problems of traffic flow, traffic control, and transportation engineering

Outcome 4: Design a complex system of process to meet desired needs, within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
   a. Design traffic, and/or traffic control features of simple transportation facilities or systems
   b. Document designs by means of brief written reports

Outcome 6: Solve well-defined engineering problems in four technical areas appropriate to civil engineering.
   a. Solve typical transportation engineering problems related to traffic flow analysis, traffic data analysis, highway capacity, traffic signal timing and coordination, and transportation demand analysis

Outcome 8: Organize and deliver effective verbal, written and graphical communications.
   a. Write a term paper focusing on an issue related to either the comparison of the characteristics of different modes of transportation or evaluation of contemporary issues in transportation engineering. These papers require use of library and internet sources
   b. Document design exercises by means of brief written reports
   c. Demonstrate findings in short oral presentations
Outcome 9: Apply relevant techniques, skills, modern engineering tools to solve a simple problem.
   a. Apply techniques related to transportation engineering, including space-time analysis, queuing analysis, network analysis, capacity analysis, and transportation demand analysis
   b. Demonstrate skill in transportation engineering problem-solving, written communication, and the use of spread sheets

Outcome 11: Demonstrate the ability to learn on their own, without the aid of formal instruction.
   a. Work on a team project that incorporates traffic design concepts, requires preparation of the project report and drawings
   b. Prepare written documentation of the project
   c. Participate in the oral presentation of the project

Resources: It is your responsibility to ensure that you are using the most recent version of every resource.
Highway Capacity Manual 2010
Project Plans 2012  as provided
Performance Measurement System (PeMS)  http://pems.dot.ca.gov (need to obtain log-in and password from the site to use)

Grading:  
Midterm  20%  March
Homework  10%
Research Paper  20%
Team Project  20%  Due May
Oral Presentation  5%  (extra credit)
Final Exam  30%

Homeworks and Exams: Home works are due at the start of the class on the day assigned. Late submittals will NOT be accepted for grade. There will be a midterm and a final exam. No make ups exams will be offered. Final Exam is scheduled on Tuesday, May 13, 2014 from 19:00 to 21:00 in Room 423B.

Team Project: There will be a team project (about 5-person team) that will take one semester to complete. All members of the team are expected to participate, and one grade will be given for the group effort. It is in the best interest of the whole team to obtain maximum participation, as the weakest member usually determines the quality of the project. The draft project report is due April 22 and the Final Report and Presentation is on May 6, 2014.
Extra Credit: There will be an opportunity to earn extra credit by doing oral presentations (on the progress of the team project, final project results and research papers). It is a great experience to speak in front of the audience, and everyone is encouraged to take part.

Course Outline:
- Introduction
- Traffic Characteristics
  - Stream Characteristics
  - Human Factors
  - Vehicular Characteristics
  - Analytical Techniques
- Traffic Data Analysis
  - Traffic Demand
  - Facility Capacity
  - Statistical Applications
  - Volume, Speed, Delay
- Traffic Control Devices
  - Signals
  - Stop Signs
  - Pedestrian Traffic
  - Bicycle Traffic
  - Total Traffic Management
- Freeway Traffic Management
  - Freeway Traffic Management Systems
  - Freeway Capacity Analysis
  - Shockwave and Incident Traffic Management
  - Ramp Metering
- Signalized Intersection Analysis
  - Intersection Signalization, Detectors, Controllers, Operations
  - Analysis and Design of Signalized Intersections
  - Traffic Signal Coordination
  - Operational Analysis and Design of Signalized Intersections
- Intelligent Transportation Systems

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Disability Services. Your cooperation is appreciated.