CE 539, CE 493W: Traffic Engineering Operations

1.0 General:

Meeting Time : 2:00 P.M - 3:15 P.M., M-W
Location : ESB 355
Pre-requisite : CE 332 or consent of instructor
Instructor : Avinash Unnikrishnan
Office : Room Number 621, ESB
Email : Avinash.Unnikrishnan@mail.wvu.edu
Office hours : 12:30 P.M. – 2:00 P.M., M-W

2.0 Course Description:

Traffic Engineering combines the study of traffic systems with topics from transportation system, highway design and basic statistical analysis, in order to analyze and design various types of traffic facilities. In general, we discuss components of traffic systems, measurement of traffic data, characterizing traffic system performance, analysis of existing traffic facilities, and design of traffic facilities for achieving desired system performance.

3.0 Course Objectives:

This course has four main learning objectives:

(i) Understanding, interpreting traffic data, and analyzing the performance of various traffic facilities

This objective involves the ability to identify, collect, and interpret traffic engineering data (speed, volume, density etc., and their interrelationships). The use of basic statistical analysis techniques to analyze the data, characterizing performance measures on existing facilities based on data are also included. Examples include the ability to analyze the impact of changes to geometric elements such as median, clearances on system performance, on the speed and flow on multi-lane and two-lane highways.

(ii) Design of traffic facilities and control devices

The objective involves understanding the rationale behind design procedures (e.g. critical lane volumes etc.) for each facility, and practice in designing various facilities to meet demand or specified LOS criteria. The knowledge of use and design of traffic control devices is also relevant to this objective.

(iii) Proficiency in basic traffic engineering concepts

This includes knowledge of the factors and agents influencing traffic performance, objectives of traffic engineering analysis and design – safety, efficiency, and delay, and understanding the interactions between the traffic engineering components – namely, drivers, roads, and control devices.

(iv) Ability to communicate traffic engineering data and analysis procedures
The objective is intended to develop students' skills in collecting, organizing and presenting data and analysis results, to an audience of peers, through both verbal and written communications. Also included in this objective, is the ability to monitor and evaluate data collection, design and analysis procedures of your peers.

4.0 Textbook

Required:
Traffic Engineering, 4th Edition, Roger P. Roess, Elena S. Prasass, William R. McShane, Prentice Hall, July 4th 2010.

Course Supplements:
At specific points in the course we will use course supplements and handouts to present information not specifically covered in the class textbook.

5.0 Evaluation of Student Work

Homeworks (30%)

Regular Problem Solving homework: You will be assigned these homework's well in advance and will consist mainly textbook problems. The tentative list of problem solving homeworks are:

HW1: Traffic stream components and characteristics
HW2: Statistical Analysis of basic traffic data
HW3: Characterizing traffic – volume, speed, travel time, delay, density
HW4: Capacity Analysis: capacity, level of service, design applications
HW5: Intersection control: identifying appropriate control devices using MUCTD

Homework is due on the assigned day as noted in the homework, at the beginning of class, unless otherwise noted in class. Homework turned in after due date and time will be deemed late. Late homework will be accepted for two days (after the due date) with a penalty of 25%. If the student is unable to submit the homework in time, the student must contact the instructor in advance and make arrangements.

Simulation Homework: You will have one or two simulation homeworks where you will use VISSIM Traffic Simulator to simulate an intersection/roadway segment.

In-Class Exercises (10%)

In class learning activities and exercises will be used throughout the semester. From among these, nearly 7-8 (to be announced in relevant class) will count towards the assignment grade, and will be due at the beginning of the following class. Late submission of in-class exercises will not be accepted except under extenuating circumstances. You are responsible for in-class exercises, even if absent from class for authorized activities.

Mid Term Exam (25%)

The mid term exam will be scheduled when 35-40% of the course is covered and will be a closed book exam.

Final Exam (30%)

The final exam will follow the course schedule.

Class Participation (5%)

Up to an additional 5% may be awarded at the instructor's discretion for class participation, exceptional effort, improvement, etc. These points are non-negotiable!

6.0 Other Course Policies

Bring the **course text, handouts, calculator and note taking material** to each class period.

If you have difficult understanding a concept, coordinate a time for additional instruction with me on a needed basis. Remember, additional instruction is to answer specific questions regarding problem solving techniques or concepts. This will not be an individual teaching session for students who have missed classes.

Collaboration among students is authorized and encouraged. However, this discussion should be an active exchange of information. It is the responsibility of each student to indicate sources of ideas and facts received from others.

A significant portion of engineering is written communication of engineering analysis and design work. Heavy emphasis will be placed on the clarity, organization and readability of your work. All assumptions must be explicitly stated and justified as necessary. I will exercise significant freedom in decrementing work due to poor readability. Homework assignments will be graded on the basis of apparent effort, completeness, and clarity of presentation.

7.0 Tentative Grading Policy:

Tentative Policy would be:

90+	- A
80-89.99	- B
70-79.99	- C
60-69.99	- D
< 60	- F

8.0: Tentative List of Topics

Block 1: Introduction
Block 2: Basic Components and Elements of Traffic System
Block 3: Statistical Analysis Techniques
Block 4: Traffic Engineering Data Collection
Block 5: Uninterrupted Flow Analysis and Applications
Block 6: Interrupted Flow Analysis and Applications
Block 7: Signalized Intersections – II