

CE 350-002 Transportation Engineering

Spring 2017

Brief Course Description

This course will discuss the principles and practices of transportation engineering and urban transportation planning. The major topics of this course cover 1) highway geometric design, 2) capacity analysis of highway and intersection, and 3) travel demand forecasting. The course will have a group project investigating real world example problems related to traffic impact analysis studies for transportation facilities.

Course Objectives

1. Understand the principles and practices of transportation engineering and urban transportation planning.
2. Understand the interactions between transportation planning and land use planning, economics, social planning and master plans.
3. Gain the facility of utilizing the state of the art techniques and models in the field.
4. Have the capability to identify and solve transportation problems within the context of data availability and limitations of analysis tools

Instructor Info & Office Hour

Professor Joyoung Lee, Ph.D.

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Office Hour: Wednesday 3:00-5:00PM; Friday 3:00-4:00PM

Lecture Hours and Location

TBD

Textbook

F. Mannering and S. Washburn. Principles of Highway Engineering and Traffic Analysis, **5th Edition**, John Wiley & Sons, Inc., ISBN 978-1-1181-2014-9

Grading

Quiz 1: 20%

Mid-term Exam: 25%

Final Exam: 25%

Homework: 12%

Group Project: 18%

Group Project

The class will be divided into multiple groups to conduct virtual traffic impact analysis (TIA) studies dealing with level of service analysis for transportation facilities such as freeway, interchange, intersection, and parking lot. Each group will perform the modeling of such facilities by using a microscopic traffic simulator, VISSIM, and Highway Capacity Software (HCS).

Each group must submit the list of group members by the end of Test 1 (i.e., the 4th week of the semester) and the presentation of the group project will be held in the 15th week of the semester. The format of the final report is free but following sections must be included in the report.

- a. Goal and objectives of the project;
- b. Spatial and temporal scopes of the project;
- c. Project site description (e.g., intersection geometry, traffic condition, signal phase sequence, etc.);
- d. Data collection summary (e.g., approach volume, green time, yellow time, saturation flow rate, etc.);
- e. Level of service analysis summary; and
- f. Conclusions and Recommendations (if any).

Exam/Homework Policies

Exam: All exams will be in-class closed book. Students are allowed to bring their own one-page formulation sheet which must be submitted to the instructor along with the question and answer sheet at the end of each exam.

Homework: Problems will be assigned to reinforce course learning objectives. The assignments will be targeted to provide practice for methods that may be included in course exams. There will be approximately two homework assignments during the semester. Homework should be turned in at the start of the class period identified by the instructor. No late homework will be accepted.

Collaborating, sharing, and/or copying for exam/homework is **NOT** allowed. Credit will not be given to individuals who either asked or allowed such behaviors. The NJIT honor code will be upheld and any violation will be brought to the immediate attention to the Dean of Students.

See http://studentsenate.njit.edu/wp-content/uploads/2010/03/University_Code_on_Academic_Integrity.pdf

Class Polices

Cell Phones and mobile devices (e.g., Laptop, iPad/Tablet PC, iPod, etc.): Cell Phone should be turned off prior to coming to class. Texting and the use of mobile devices during the class shall not be allowed. Each student will be excused to miss up to two classes with prior permission/**VALID** reason. Each subsequent class missed will cost the student up to 5% of the overall grade. Five (5) or more missed classes will result in an F grade.

Course Schedule

Week	Topic	Chapter in Text	Assignment
1	Course Overview & Introduction to Transportation Engineering Road Vehicle Performance: Principles of Braking, Braking Forces	<i>Ch.1</i>	
2	Road Vehicle Performance: Stopping Sight Distance Geometric Design of Highway: Vertical Curve	<i>Ch. 2 pp. 9-41</i>	Homework #1
3	Geometric Design of Highway: Vertical Curve & Horizontal Curve	<i>Ch.3 pp. 47-92</i>	Homework #2
4	Geometric Design of Highway: Horizontal Curve /Test 1	<i>Chapter 1, 2, and 3</i>	Quiz #1
5	Fundamentals of Traffic Flow	<i>Ch. 5 pp. 135-168</i>	
6	Highway Capacity and Level of Service Analysis : Basic Freeway Segment	<i>Ch. 6 pp. 169-192</i>	Homework #3
7	Highway Capacity and Level of Service Analysis : Multilane Highways & Two-lane Highways	<i>Ch. 6 pp. 193-219</i>	Homework #4
8	Highway Capacity and Level of Service Analysis : Two-lane Highways /Test 2	<i>Ch. 5,6</i>	Midterm Exam
9	Spring Recess : No Class		
10	Lab: VISSIM Microscopic Traffic Simulation Model		
11	Traffic Control and Analysis at Signalized Intersections	<i>Ch.7 pp. 253-279</i>	Homework #5
12	Lab: Highway Capacity Software		
13	Travel Demand and Traffic Forecasting: Trip Generation, Trip Distribution, Mode Choice	<i>Ch. 8 pp. 285-303</i>	Homework #6
14	Travel Demand and Traffic Forecasting: Traffic Assignment & Traffic Forecasting in Practice	<i>Ch. 8 pp. 303-324</i>	Quiz #2
15	Group Project Presentation		
16	Final Exam		