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Fall 2018

CE 350-103: Transportation Engineering

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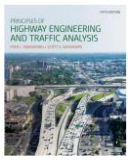
New Jersey Institute of Technology
DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

Course: CE 350 – 103 Transportation Engineering
Term: Fall 2018
Day/Time: Friday @ 6:00pm – 9:00pm
Location: Central King 223

Instructor: Mr. Louis Luglio, P.E., phone: 201.805.8819, Email: Luglio@NJIT.edu
Assistant: TBD
Office Hours: Friday before or after class or by appointment

Text: Principles of Highway Engineering & Traffic Analysis Edition: 5th Edition
Author: Mannering
Edition: 5th
ISBN: 978-1-1181-2014-9 --- Copyright Year: 2013
Publisher: John Wiley & Sons, Incorporated



Prerequisite: CE 200, CE 200A,. A study of the principal modes of transportation, with emphasis on the planning, design, and construction of facilities for modern transportation systems

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 intersections, 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:

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

Topics: Transportation Planning, Transportation Economics, Demand Forecasting, System Evaluation, Capacity Analysis, Intersection Design/Analysis, Environmental Considerations

Grading: **Homework: 10%, (5 @ 2% each)**
Quiz 5% (5 @ 1%each)
Midterm Exam 25%,
Group Project 30%, (15% Written Report, 15% Group Presentation)
Final Exam 30%

Exams: All exams will be in-class OPEN book.

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 to three 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

Course Outline: FRIDAY ***** Section 103 Transportation Engineering**

Date	Topic	Reading	Group Project
9/7 W1	Course Overview & Introduction to Transportation Engineering	Ch 1 **HW#1** Traffic Counts	Group Project Discussion Group Selections
9/14 W2	Road Vehicle Performance: Principles of Braking, Braking Forces, Stopping Sight Distance	Ch 2 **HW#1 Due**	Peak Hour Volumes & Traffic Volume Diagrams
9/21 W3	Geometric Design of Highway: Vertical Curve	Ch 2 p 9-41 **HW#2**	Group Project Discussion Traffic Signal Timings
9/28 W4	Geometric Design of Highway: Horizontal Curve	Ch 3 p 47-92 **HW#2 Due**	HCS Software CE Lab
10/5 W5	Fundamentals of Traffic Flow	Ch 5 p 135-168 **HW#3**	HCS Software CE Lab
10/12 W6	Highway Capacity and Level of Service Analysis: Basic Freeway Segments	Ch 6 p 175-190 **HW#3 Due**	HCS Software CE Lab
10/19 W7	**Mid Term EXAM**	Ch 2 & 3	
10/26 W8	Highway Capacity and Level of Service Analysis: Multilane Highways	Ch 6 p 193-199 **HW#4**	No Build Considerations
11/2 W9	Highway Capacity and Level of Service Analysis: Two-lane Highways	Ch 6 p 202-214 **HW#4 Due**	Trip Generation
11/9 W10	Traffic Control and Analysis at Signalized Intersections	Ch 7 p 225-253 **HW#5**	HCS Software CE Lab
11/16 W11	Signalized Intersection Analysis	Ch 7 p 254-274 **HW#5 Due**	Trip Distribution
11/21 **WEDESDAY** Last Class W12	**WEDESDAY** Travel Demand and Travel Forecasting: Trip Generation, Trip Distribution, Mode Choice NO CLASS ON 11/23	Ch 8 p 285-303	HCS Software CE Lab
11/30 W13	Travel Demand and Traffic Forecasting: Traffic Assignment & Traffic Forecasting in Practice	Ch 8 p 303-324	Project wrap-up
12/7 Last Class W14	Group Presentations and Reports Due	**Group Project Written Report Due**	Group Project Presentation
12/13 & 14 Reading	Reading Days		
12/21 Final	**FINAL EXAM**	Ch 6, 7 & 8	

Attendance: Attendance is mandatory. Unexcused absences will have an adverse effect on your grade. Each class attendance represents approximately 1% of the total grade.

Note: All questions and problems regarding homework assignment, project, and exam grading must be resolved within one week after your papers are returned. No changes will be made after that time.

Group Proj.: The class will be divided into multiple groups (i.e., 5 members per each group) 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 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 14th week of the semester, which is the due date of the final report. The format of the final report is free but following sections must be included in the report.

a. Goals 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).

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.

Outcomes Course Matrix – CE 350-103 Transportation Engineering

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Demonstrate the principles and practices of transportation engineering and urban transportation planning.			
Discuss public transportation facilities.	2, 7	1, 2	Discussions, quizzes, and homework
Develop tools transportation facilities.	2, 7	1	Homework and quizzes.
Implement design of transportation facilities.	2	1, 2	Graded projects.
Student Learning Outcome 2: Recognize the interactions between transportation planning and land use planning, economics, social planning and master plans.			
Link transportation to land use, economics, social planning, and master plans.	2, 4	2, 3	Homework and quizzes.
Develop interactions between each of the above factors.	2, 4	2, 3	Homework and quizzes.
Give examples of growth due to improvement in transportation.	2	2, 3	Discussions, quizzes, and homework
Student Learning Outcome 3: Employ state of the art techniques and models in the field.			
Introduce need for forecasting models.	1, 2, 7	1, 2	Homework and quizzes.
Discuss application of models.	1, 2, 7	1, 2	Homework and quizzes.
Assign large scale problems.	1, 2, 7	1, 2	Quizzes and graded assignments.
Student Learning Outcome 4: Identify and solve transportation problems within the context of data availability and limitations of analysis tools.			
Discuss how to obtain data necessary for transportation studies.	7	1, 2	Homework.
Match up analysis tools, data sets and problems to solve.	2, 7	1, 2	Quizzes and homework.
Introduce problems to be solved using analysis tools.	2, 7	1, 2	Quizzes and homework.

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students
- to promote service to the engineering profession and society

Our program educational objectives are reflected in the achievements of our recent alumni:

1 – Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.

2 – Professional Growth: Alumni will advance their skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.

3 – Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics

2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Revised: 2/13/18