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Fall 2020

CE 350-101: Transportation Engineering

Joyoung Lee

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DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CE 350-101 Transportation Engineering Fall 2020

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 highways 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.

Canvas:

Instructor: Joyoung Lee

Office: Room #274 Tiernan Hall

Office Hours: 3~5 PM Thursday, 10~11AM Friday, Anytime by appointment

Email: jo.y.lee@njit.edu

Suggested Text:

F.L. Mannering and S.S. Washburn. Principles of Highway Engineering and Traffic Analysis, **6th Edition**, John Wiley & Sons, Inc., ISBN 978-1-1193-8558-5

Course Sections:

Meeting	Section Dates	Topic/Assignment
	101	
1	9/3	- Course Overview & Introduction to Transportation Engineering - Road Vehicle Performance: Principles of Braking
2	9/10	- Road Vehicle Performance: Braking Forces, Stopping Distance - Geometric Design of Highway: Vertical Alignment - Assignment #1
3	9/17	- Geometric Design of Highway: Vertical Alignment - Geometric Design of Highway: Horizontal Alignment
4	9/24	- Geometric Design of Highway: Horizontal Alignment - Geometric Design of Highway: Combined Vertical and Horizontal Alignment - Assignment #2
5	10/1	- Geometric Design of Highway: Combined Vertical and Horizontal Alignment - Fundamentals of Traffic Flow
6	10/8	- Fundamentals of Traffic Flow - Assignment #3

7	10/15	Midterm Exam
8	10/22	- Queuing Theory and Models - Assignment #4
9	10/29	- Highway Capacity and Level of Service Analysis: Basic Freeway Segment/Multi-Lane Highway - Lab: Highway Capacity Software
10	11/5	- Highway Capacity and Level of Service Analysis : Multi-Lane Highway/Two-Lane Highway - Lab: Highway Capacity Software - Assignment #5
11	11/12	- Traffic Control and Analysis at Signalized Intersections
12	11/19	- Traffic Control and Analysis at Signalized Intersections - Lab: Highway Capacity Software - Assignment #6
-	11/26	Thanksgiving Recess: No Class
13	12/3	- Lab: VISSIM
14	12/10	- Group Project Presentation

Grading Policy:

- Assignment: 18% (3% @ each)
- Mid-term Exam: 30%
- Final Exam: 30%
- Group Project: 27%
- Extra Credit: up to 5%

Grading Scale:

A:	100-90
B+:	89-85
B:	84-80
C+:	79-75
C:	74-70
D:	69-60
F:	Below 60

Attendance Policy:

- Each student will be excused to miss up to two classes with prior permission/VALID reason. Each subsequent class absence will be reported to the Dean of Students and may affect student's standing and grade.
- Five (5) or more missed classes may result in an F grade.

Withdrawals:

In order to insure consistency and fairness in application of the NJIT policy on withdrawals, student requests for withdrawals after the deadline will not be permitted unless extenuating circumstances (e.g., major family emergency or substantial medical difficulty) are documented. The course Professors and the Dean of Students are the principal points of contact for students considering withdrawals.

NJIT Honor Code:

The NJIT Honor Code will be upheld; any violations will be brought to the immediate attention of the Dean of Students. The Honor Code can be found at (<http://www5.njit.edu/doss/policies/honorcode/index.php>).

Assignment Policy:

- The assignments will be targeted to provide practice for methods that may be included in course exams. There will be approximately seven 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 of exam/homework is **NOT** allowed. Credit will not be given to individuals who either initiated, allowed, or participated in such behaviors. The NJIT honor code will be upheld and any violation will be brought to the immediate attention of the Dean of Students.

Syllabus Information:

The dates and topics of the syllabus are subject to change; however, students will be consulted with and must agree to any modifications or deviations from the syllabus throughout the course of the semester.

Email Policy:

N/A

Items Required for this Course:

1. Scratch Paper
2. Engineering Scientific Calculator
3. Pencil and Eraser
4. Ruler

Dress Policy:

N/A

Outcomes Course Matrix – CE 350-101 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: 9/3/19