

Spring 2021

## **CE 350-004: Transportation Engineering**

Rongfang Liu

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# SYLLABUS

## CE 350: Transportation Engineering

### Spring 2021

#### **Meeting Time and Location:**

Section 002: MW 9:00 – 10:20 AM, Synchronous Online  
Section 004: TR: 12:30 – 1:50 PM, Synchronous Online

#### **Instructor:**

Dr. Liu  
Office: 217 Colton  
Phone Number: 5884  
Email: Rliu@njit.edu

#### **Office Hours:**

M: 10 AM - 1 PM or by appointment

#### **TextBook:**

Fred L. Mannering, Scott S. Washburn, Principles of Highway Engineering and Traffic Analysis, 7th Edition, John Wiley & Sons, Incorporated, ISBN 978-1-119-49414-0.

#### **Course Objectives**

1. Learn the fundamentals needed to undertake upper-level transportation courses;
2. Gain basic knowledge of highway engineering and traffic analysis for entering transportation employment
3. Obtain knowledge necessary to answer transportation related questions on the Civil Engineering FE and PE Exams
4. Understand the principles and practices of transportation engineering, especially highway design and traffic operations.

#### **Course Prerequisites:**

CE200  
CE 200A

## **Attendance Policy:**

Each student may be excused to miss a maximum of TWO (2) 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.

## **Grade Policy:**

Homework/Quizzes	30%
Midterm Exam	30%
Group Project	25%
Project Presentation	10%
Attendance	5%

**The NJIT Honor Code will be upheld, any violations will be brought to the immediate attention of the Dean of Students. Students will be consulted with by the instructor and must agree to any modifications or deviations from the syllabus throughout the course of the semester.**

At a major university like NJIT, the faculty have obligations of diverse types. Some of the duties include involvement with ASCE, TRB, and other professional organization. In addition, research activities may require faculty to attend conferences, to present papers, and to participate in other activities. The instructor will make every effort to miss as few classes as possible. In case it can't be avoided, she will arrange other alternatives to enrich the course and the learning experience.

## CE 350 Class Schedule, Spring 2021

ID	Week of	Contents	HomeWork
1	1/18	Introduction Chapter 1. Highway Engineering and Traffic Analysis	
2	1/25	Chapter 2.1: Road Vehicle Performance	<i>Assignment 1</i>
3	2/1	Chapter 2.2 Tractive Effort	
4	2/8	Chapter 2.3 Breaking	<i>Assignment 2</i>
5	2/15	Chapter 3.1 Vertical Curves	
6	2/22	Chapter 3.2 Horizontal Curves	<i>Assignment 3</i>
7	3/1	<b>Midterm Exam: Covering Chapter 1, 2 and 3.</b>	
8	3/8	No class, Spring Break	
9	3/15	Chapter 5.1 Traffic Flow	<i>Assignment 4</i>
10	3/22	Chapter 5.2 Queuing Model	
11	3/29	Chapter 6.1 Level of Services	<i>Assignment 5</i>
12	4/5	Chapter 6.2 Multilane/Two Lane Highways	
13	4/12	Chapter 7. Traffic Control and Analysis	Project Assignment
14	4/19	Chapter 7.2 Signalized Intersection Analysis	
15	4/26	Project Presentation	
16	5/3	<b>Final Period</b>	<b>Group Project Due</b>

## Outcomes Course Matrix

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

## **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 safe, practical, 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 technical and interpersonal 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:

- an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics;
- 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;
- an ability to communicate effectively with a range of audiences;
- 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;

- 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;
- an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions;
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Revised: 2/13/18