



## Course Outline

### 1 BASIC INFORMATION

#### 1.1 COURSE DESCRIPTION

Fundamentals of traffic engineering; Traffic flow characteristics; Travel demand forecasting; Analysis and design of the capacity of urban and rural roadway segments and intersections; Traffic control devices, systems and warrants; Transportation planning; Public transportation systems; Transportation safety.

#### 1.2 COURSE CONTENTS

1. Course Overview & Introduction
2. Traffic Stream Characteristics (Chapter 5)
3. Intersection Control and Design; Traffic Signal and Signal Warrants (Chapter 8)
4. Highway Capacity Analysis (Chapter 7)
5. Public Passenger Transportation (Chapter 10)
6. Transportation Planning/Travel Demand Forecasting (Traditional Four-Step Process) (Chapter 11)
7. Traffic Accidents/Transportation Safety (Chapter 16)

#### 1.3 COURSE INFORMATION

1. Senior level undergraduate course
2. Credit hours: 3 hours of classroom contact and 6 hours of self-study per week.
3. Two classes per week having 1.5 hours of duration
4. The course requires fundamental knowledge of probability and statistics

#### 1.4 PREREQUISITE COURSE:

CEE250: Introduction to Transportation Engineering

#### 1.5 FACULTY

1. Name: Md Shoaib Chowdhury, Ph.D., P.E., F.ASCE; Professor, DCEE, Initial: SbC
2. Room No: SAC 732,
3. Phone: Office Ph: 8852000 ext. 6231
4. E-mail: [shoaib.chowdhury@northsouth.edu](mailto:shoaib.chowdhury@northsouth.edu)
5. Office hours for Summer 2019:

Sunday	01:00 pm – 02:30pm; 4:20 pm- 5:20 pm
Tuesday	01:00 pm – 02:30pm; 4:20 pm- 5:20 pm

#### 1.6 CLASS HOURS:

- Section 1: ST 11:20 am –12:50 pm (Room # SAC 304)
- Section 2: ST 02:40 pm –04:10 pm (Room # SAC 207)



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CEE 350: Traffic Analysis and Design

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## 1.7 TEXT BOOK(S):

1. *C. Jotin Khisty and B. Kent Lall, "Transportation Engineering-An introduction", Prentice Hall, Upper Saddle River, New Jersey, USA, latest Edition (Mandatory)*

2. *Papacostas, C.S. and P.D. Prevedouros, "Transportation Engineering & Planning", 3rd Edition.. Prentice Hall, Upper Saddle River, NJ, 2001. ISBN 0-13-081419-9. (Recommended)*

3. *Nicholas J. Garber and Lester A. Hoel, "Traffic and Highway Engineering", Cengage Learning, 5th edition, January, 2014. (Recommended)*



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## 2 COURSE OBJECTIVES AND OUTCOMES

### 2.1 COURSE OBJECTIVES:

1. To address the traffic engineering problems (involving design and operational analysis) that deal with traffic stream characteristics and flow theory, traffic control devices and intersection control, highway capacity and level of service, and traffic signal
2. To provide students with an understanding of the basic principles and practices of transportation planning and the traditional four-step travel-demand forecasting process
3. To prepare students for oral presentation and/or written report on a transportation/ traffic engineering topic/project

### 2.2 COURSE OUTCOMES (COs):

- 2.2.1 CO1: explain the fundamental speed, flow, and density relationship and apply traffic flow models to analyze traffic flow characteristics
- 2.2.2 CO2: perform highway capacity and level of service analysis on a roadway segment and design a roadway segment for a specific capacity
- 2.2.3 CO3: understand and utilize the traditional four-step travel-demand forecasting process to solve simple travel demand forecasting problems
- 2.2.4 CO4: prepare oral presentation and/or written report on a transportation/traffic engineering topic/project

### 2.3 MAPPING OF COURSE OUTCOMES TO BSCEE PROGRAM OUTCOMES

L: Slightly maps (low); M: Moderately maps (medium); H: Substantially maps (high)

	PO - 1	PO - 2	PO - 3	PO - 4	PO - 5	PO - 6	PO - 7	PO - 8	PO - 9	PO - 10	PO - 11	PO - 12	PO - 13
CO1	H												
CO2	H												
CO3		M											
CO4										L			

### 2.4 CO DELIVERY AND ASSESSMENT

Course outcomes	Bloom's taxonomy, domain/level (C: Cognitive, P: Psychomotor A: Affective)	Delivery methods and activities	Assessment tools
CO1	C6	Lecture, examples, exercises/hands-on practice	Home-work, Exam
CO2	C6	Lecture, examples, exercises/hands-on practice	Home-work, Exam



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CO3	C3	Lecture, examples, exercises/hands-on practice	Home-work, Exam
CO4	A3; P2	Lecture, group discussions (field visit/data collection)	Group Assignment/Project (Written report/Oral presentation)

2.4.1 Cognitive domain (knowledge-based): C

1: Knowledge, 2: Comprehension, 3 Application, 4 Analysis, 5: Synthesis, 6: Evaluation

2.4.2 The affective domain (emotion-based): A

1: Receiving, 2: Responding, 3: Valuing, 4: Organizing, 5: Characterizing

2.4.3 The psychomotor domain (action-based): P

1: Perception, 2: Set, 3: Guided response, 4: Mechanism, 5: Complex overt response, 6: Adaptation, 7: Origination



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## 3 BSCEE PROGRAM OUTCOMES (PO)

### 3.1.1 PO – 1: Engineering Knowledge

Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex civil engineering problems.

### 3.1.2 PO – 2: Problem analysis

Identify, formulate, research the literature and analyze complex civil engineering problems and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences.

### 3.1.3 PO – 3: Design/development of solutions

Design solutions for complex civil engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns.

### 3.1.4 PO – 4: Investigation

Conduct investigations of complex problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

### 3.1.5 PO – 5: Modern tool usage

Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex civil engineering activities with an understanding of the limitations.

### 3.1.6 PO – 6: The engineer and society

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional civil engineering practice.

### 3.1.7 PO – 7: Environment and sustainability

Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

### 3.1.8 PO – 8: Ethics

Apply ethical principles and commit to professional ethics, responsibilities and the norms of the civil engineering practice.

### 3.1.9 PO – 9: Individual work and teamwork

Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.

### 3.1.10 PO – 10: Communication

Communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions.

### 3.1.11 PO – 11: Project management and finance

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member or a leader of a team to manage projects in multidisciplinary environments.

### 3.1.12 PO – 12: Life-long learning

Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.

### 3.1.13 PO – 13: Contemporary Issues

Demonstrate sound knowledge on global and local contemporary civil engineering issues.



## 4 COURSE ASSESSMENT

### 4.1 TEACHING/LEARNING STRATEGIES

#### 4.1.1 Lectures

- Attend all classes punctually
- Follow worked examples taught in the class and provided in the textbook
- Solve exercises from the textbook and homework problems
- Discuss/work with group members/peers to solve problems

#### 4.1.2 Private study

- Review lecture materials and study relevant contents from the textbook

### 4.2 ASSESSMENT

- Home works will be given on closely related lecture topics to test students ability in solving analytical problems
- Midterm exam and final exam will contain questions related the topics covered in class
- Project/group assignment will be given to test students ability in solving real world problems by utilizing the analytical methods/tool/techniques learned in class

### 4.3 EVALUATION:

Distribution of numerical scores		Remarks
Home work-I	5%	No late home-work will be accepted unless there is a valid (e.g. medical) reason for late submission.
Home work-II	5%	
Home work-III	5%	
Home work-IV	5%	
Project (Group Assignment)	15%	Each group must submit a project report and deliver a formal presentation; Tentative topic: Signal warrant/ Signal timing plan
Midterm	30%	Duration: One hour or longer
Final Exam	35%	Duration: One hour or longer

### 4.4 GRADING POLICY:

Generally, NSU grading policy will be followed. However, minor deviation is still possible depending on the situation.

### 4.5 EXAM POLICY:

NO MAKE UP for MID-TERM OR FINAL EXAM WILL BE ARRANGED UNLESS AN ABSOLUTELY UNAVOIDABLE VALID REASON FOR ABSENCE IS FOUND. For such unavoidable circumstances, written explanation of the situation must be submitted before the exam. If the mid-term exam cannot be held on the due date, the exam will be automatically shifted to the very next available class, unless otherwise announced.



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## 5 LECTURE SCHEDULE

\* One Day = 1.5 lecture hours, Total 24 days lecture = 36 lecture hours

Day*	Tentative Lecture Topic/ Material Covered	Home Work/Project	
		Assigned	Due
1	Course Overview & Introduction		
2-7	Traffic Stream Characteristics (Chapter 5)- Greenshield and Greenberg's models; Intersection Control and Design;	HW-I	HW-I
8-11	Traffic Signal and Signal Warrants, (Chapter 8)	HW-II	
12	Traffic Signal and Signal Warrants (continued), (Chapter 8); Midterm Exam Review		HW-II
13	<b>Midterm Exam</b>		
14-17	Highway Capacity and Level of Service Concepts and Analysis (Chapter 7); Public Passenger Transportation (Chapter 10)	Project; HW-III	
18-22	Urban Transportation Planning- An Introduction; Travel Demand Forecasting (Traditional Four- Step Process–Trip Generation, Trip Distribution, Mode Usage, Trip Assignment) (Chapter 11)	HW-IV	HW-III
23	<b>Project Presentation</b>		Project Report; HW-IV
24	Traffic Accidents/Safety (Chapter 16); Final Exam Review		
<b>Final Exam</b> (As per schedule declared by NSU)			

## 6 CODE OF CONDUCT

Students must comply with the code of conduct as stated in the NSU policies  
(<http://www.northsouth.edu/academic/academic-information-and-policies.html>)

- It is highly requested to maintain discipline in the class like not to be late, refrain from making noise during lecture time, not to leave the class early.
- Adopting unfair means in the exams will be considered as a serious crime and the student shall be placed to the university disciplinary committee.
- All materials should be neat and clear, and demonstrate professionalism
- Direct duplication of the work of another is a big offense
- Paraphrasing another person's work with very minor changes keeping the meaning is also plagiarism