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Fall 2020

TRAN 615-851: Traffic Studies and Capacity Analysis

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Recommended Citation

Daniel, Janice, "TRAN 615-851: Traffic Studies and Capacity Analysis" (2020). *Civil and Environmental Engineering Syllabi*. 485.
https://digitalcommons.njit.edu/ce-syllabi/485

NJIT
New Jersey's Science & Technology University

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

TRAN 615 Traffic Studies and Capacity Analysis - Fall 2020

Course Description:

The objective of this course is gain and understanding of highway capacity concepts and traffic studies used to evaluate the performance of transportation facilities. To be able to analyze the operation performance of interrupted flow facilities including: basic freeway sections, weaving areas, ramps and ramp junctions, multi-lane and two lane roadways

Canvas:

The canvas course can be found at: https://canvas.njit.edu/. Please sign in using your UCID and password. If you are unable to log in or experience a problem please contact the NJIT Helpdesk - (973) 596-2900.

Instructor: Prof. J. Daniel
Office: Fenster Hall Room 269
Office Hours: Mondays and Wednesdays, 10:00 am – 12 pm (or by appointment)
Email: daniel@njit.edu

Required Text:

Roger P. Roess, Elena S. Prassas and William R. McShane, Traffic Engineering, Prentice-Hall Inc, 5th Edition 2019.

Reference Text:

Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis. Transportation Research Board, National Research Council, Washington, D.C., 2016

Weekly Topics:

Week of	Topic	Reading
9/1	Introduction – Traffic Flow Fundamentals	**Chapters 1 and 5**
9/7	Introduction to Traffic Capacity Analysis	Chapter 7 and 28
9/14	Multilane Highways Capacity Analysis	Chapter 28
9/21	Weaving Area Capacity Analysis	Chapter 29
9/28	Ramps and Ramp Terminal Capacity Analysis	Chapter 30
10/5	**Test # 1 – Covering Chs. 1, 5, 7, 28**	
10/19	Two-Lane Rural Highways Capacity Analysis	Handout
10/26	Freeway Systems Capacity Analysis	Handout
10/28	Traffic Studies – Statistical Analysis	Handout
11/2	Volume Studies and Characteristics	Chapters 9 and 10
11/9	**Test # 2 – Covering Chs. 29 and 30**	
11/16	Speed, Travel Time, and Delay Studies	Chapter 11
11/23	Highway Traffic Safety Studies	Chapter 12
11/30	Highway Traffic Safety Studies	Chapter 12
12/7	**Final - Covering Chs 9 – 12, Two-Lane Hwys, Freeway Systems, Statistical Analysis**	

Grading Policy:

HW	20%
Discussion Question	5%
Tests(2)	50%
Final Test	25%

Grading Scale:

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

NJIT Honor Code:

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.

Assignment Policy:

Homework will NOT be thoroughly graded, but you will still need to turn in your homework. Credit will be provided based on your final answers given. No credit will be provided once solutions have been posted. For homework assignments you should submit two items: (1) electronic copy of the completed homework (Word, pdf, excel); and (2) An excel spreadsheet I will provide to you with every homework assignment where you will input your final answers for your homework. You will not be able to include all of your answers in the excel spreadsheet.

You should identify how you will submit assignments electronically. You can submit all types of attachments (pdf, doc, xls). For some assignments which includes calculations, it may be easier to scan your written work into a pdf and submit that document, rather than type out the equations. Please avoid submitting attachments that are photos of your assignment as it is typically difficult for me to read these types of attachments. If you choose to submit excel spreadsheets, please note that I will not be able to look at your formula or how the calculation was determined. Therefore, you should show all the steps to get to your final calculation.

Discussion Questions:

Discussion questions will be posted asking you to provide your thoughts on the question as it relates to a weekly topic. You should provide a brief, yet thoughtful, response. You should also provide a brief thoughtful response to three other student's posts stating the basis for your agreement, disagreement or asking a follow-up question with a justification for your question.

Important Dates:

Test #1   Wednesday, October 7, 2020 (7:00 pm – 8:30 pm)
Test #2   Wednesday, November 11, 2020 (7:00 pm – 8:30 pm)
Final Test   Wednesday, December 9, 2020 (7:00 pm – 8:30 pm)

Please make all efforts to be available to take the exam during these dates and times.

Exam Policy:

All exams are a 90 minutes administered through Canvas. Tests consists of various types of questions including some fill-in questions, some multiple choice questions, some calculation questions. The questions and some input variables will be randomly determined so each test will have some differences. To save time, you should provide your final answer during the test time and must submit any calculations used to reach the final answer after the completion of the test.

Exam Proctoring Requirement:

Exam Proctoring Requirement NJIT policy requires that all midterm and final exams must be proctored, regardless of delivery mode, in order to increase academic integrity. In this course you are required to use ProctorU to ensure academic integrity for exams. More information can be found at the following link: https://ist.njit.edu/sites/ist.njit.edu/files/STUDENT%20-%20How%20it%20Works%20-%20Test-Taker.pdf

Syllabus Information:

The dates and topics of the syllabus are subject to change; however, students will be informed of these changes.

Email Policy:

Emails will generally be responded to within 24-business hours Monday - Friday.

Items Required for this Course:

1. Webcam for taking exams.

Outcomes Course Matrix –

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1:			
	1	1	Exams
Student Learning Outcome 2:			
Student Learning Outcome 3:			

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 a 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