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**TRAN 625 – 854**  
**Public Transportation Operations and Technology**  
(3 credits)

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**Lectures**                      Online via Canvas

**Instructor**                      Steven Chien                                      Office Hours:    by appointment  
280 Tiernan Hall  
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973-596-6083

**Prerequisite**                      Graduate standing in civil or industrial engineering or instructor approval

**Required Textbook**

Vukan R. Vuchic, Urban Transit Systems and Technology, John Wiley & Sons, Inc., 2007.

<http://www.wiley.com/WileyCDA/WileyTitle/productCd-047175823X.html>

[https://www.academia.edu/35120650/URBAN\\_TRANSIT\\_SYSTEMS\\_AND\\_TECHNOLOGY](https://www.academia.edu/35120650/URBAN_TRANSIT_SYSTEMS_AND_TECHNOLOGY)

**Other Recommended Texts & Reading**

Class Notes

**Course Description**

The course provides basic introduction to the field of public transportation operations, technology, and analysis. Approaches provided in this course will be applicable to different types of public transportation system problems. The approaches will integrate concepts from economics, engineering, operations research, and theoretical analysis. Numerical examples will be provided to build understanding of the concepts and to indicate how they can be applied in practice to various modes and problems.

**Course Objectives (General)**

By the end of this course, the student will be able to:

- Present the technological and engineering aspects of public transportation systems
- Calculate the cost associated with public transportation systems
- Evaluate vehicle and right-of-way characteristics, capacity and operating strategies
- Analyze public transportation system performance

## **POLICIES & PROCEDURES**

**Academic Integrity:** It is expected that NJIT's University Code on Academic Integrity will be followed in all matters related to this course. Refer to NJIT's Dean of Students website to become familiar with the Code on Academic Integrity and how to avoid Code violations.

<https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>

**Communication:** WebEx, E-mail, Phone

**Lectures/Class:** Lectures and materials shall be accessed via Canvas. The materials/course modules will be updated on a weekly basis.

**Handouts:** Class notes (presentation slides and references, etc.) will be available online

**Homework:** Independent work assignment. Must be submitted before the deadline.

**Homework Format:** Will be discussed in class

**Late Homework:** Late submission will not be accepted.

**Homework Solutions:** Will be available online and discussed in the class materials

**Exams:** A midterm examination and a final examination will be given. Check the dates listed in the course schedule.

**Calculation of Course Grade:** A weighted average grade will be calculated as follows:

- Class Participation 10%
- Homework 30%
- Midterm Exam 30%
- Final Exam 30%

Final letter grades are as follows:

A = 90 ~ 100, B+ = 85 ~ 89, B = 80 ~ 84, C+ = 70 ~ 79, C = 60 ~ 69, F < 60

**Instructor Commitment:** You can expect the Instructor to be courteous, punctual, organized, and prepared for lecture and other class activities; to answer questions clearly; to be available during office hours or to notify you beforehand if office hours are moved; to provide a suitable guest lecturer or pre-recorded lecture when they are traveling or unavailable; and to grade uniformly and consistently.

**Students with Documented Disabilities:** NJIT is committed to providing students with documented disabilities equal access to programs and activities. If you have, or believe that you may have, a physical, medical, psychological, or learning disability that may require accommodations, please contact the Coordinator of Student Disability Services located in the Center for Counseling and Psychological Services, in Campbell Hall, Room 205, (973) 596-3414. Further information on disability services related to the self-identification, documentation and accommodation processes can be found on the webpage at: (<http://www.njit.edu/counseling/services/disabilities.php>)

**Course Schedule: (Class Materials will be Posted on Tuesdays)**

<b>WEEK</b>	<b>TOPIC</b>	<b>READING</b>
Jan. 15	Introduction	Class Notes
Jan. 22	Discuss Course Structure and Requirements	Class Notes
Jan. 29	Public Transportation System Overview	Chap. 1
Feb. 5	Classic Optimization Methods	Class Notes
Feb. 12	Vehicle Characteristics and Motion	Chap. 3
Feb. 19	Station-to-Station Travel Analysis	Chap. 3
Feb. 26	Urban Passenger Transport Modes	Chap. 2
Mar. 4	Transportation System and User Costs	Class Notes
Mar. 11	Spring Recess (No Classes Scheduled)	
Mar. 18	Midterm Exam	
Mar. 25	Transportation System Performance	Chap. 4
Apr. 1	Microscopic Simulation Concepts and Tools	Class Notes
Apr. 8	Simulation of Bus Operations - Case Study	Class Notes
Apr. 15	Transit Service Quality & Headway Regularity	Class Notes
Apr. 22	Concepts & Intelligence in Multimodal Transportation	Chap. 7 & 8
Apr. 29	No Class	
May 6	Final Exam	

**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 public transportation problems by applying principles of engineering, science and mathematics
2. an ability to apply planning and engineering concepts to produce solutions that meet specified needs with consideration of public transportation system productivity and economic factors
3. an ability to develop and conduct appropriate experimentation, analyze, and interpret data and use engineering judgment to draw conclusions
4. an ability to evaluate the resilience, sustainability, and equity of transportation systems.