JOHN A. REIF, JR. DEPARTMENT OF
CIVIL AND ENVIRONMENTAL ENGINEERING

NJIT New Jersey Institute of Technology

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CE 495 102 Transportation Analysis and Design II Spring 2025

Course Description:

Co-requisite or Pre-requisite: CE 333, CE 432, CE 443, CE 494

Canvas:
All course materials including class lecture, homework, and project related materials will be posted on Canvas

Instructor: Babu Veeregowda, Ph.D, PE, PTOE

Office: Please contact by email

Office Hours: Dr. Veeregowda will be available online every Friday from 5:00 to 6:00 PM by appointment only. If you need a 1 on 1 at the university, please make an appointment.

Email: bkv4@njit.edu

Suggested Textbook Materials (provided, please see links below):
Manual on Uniform Traffic Control Devices https://mutcd.fhwa.dot.gov/kno_11th_Edition.htm
Highway Capacity Manual – Will be loaded onto Canvas later
City Environmental Quality Review Manual https://www.nyc.gov/site/oec/environmental-qualityreview/technical-manual.page
AASHTO Green Book – Will be loaded onto Canvas later

Course Sections:

Meeting	Section Dates			Topic/*Assignment*
1	January	24	2025	Class 1: Course Introduction • Professor Introductions • Class Schedule • Project Overview – Impacts of the proposed Major League Soccer Stadium on Bronx Terminal Market Development • Problem Statement • Traffic Impact Study for approval • Mitigate all the Impacts for approvals and avoiding the costly EIS process Analysis Tools • Quality Control • Course Deliverables
2	January	31	2025	Class 2: Selecting the Right Traffic Analysis Program • Determine goals and objectives • Determining Measures of Effectiveness • Determining the right analysis tools • Volume vs Demand • Impact Criteria • Screening Analyses • Using big data
3	February	7	2025	Class 3: Data Collection and Summarization • Data Collection ○ Traffic, Transit, and Pedestrian Counts ○ Signal Timings ○ Physical Inventory ○ Level of Service Observations ○ Historical Databases • Data Summarization ○ Eliminating outliers ○ Peak Hour Selection ○ Building a Network

4	February	14	2025	Class 4: Traffic Engineering Standards and Guidelines • Highway Capacity Manual (HCM) ○ Purpose ○ What it analyzes • Manual on Uniform Traffic Control Devices (MUTCD) ○ Purpose ○ What it analyzes • AASHTO Policy on Geometric Design (the Green Book) ○ Purpose ○ What it analyzes
5	February	21	2025	Class 5: • Synchro Introduction • Existing Analysis ○ Calibration and Validation • Work session **Deliverable 1 Draft Due**
6	February	28	2025	Class 6: • No Build Analysis • Travel Demand Forecasting - Diversions • Work session
7	March	7	2025	Class 7: Build Analysis • Determining impacts • Developing mitigation strategies ○ Readily implementable measures ○ Complicated measures **Deliverable 2 Draft Due**
8	March	14	2025	Work Session **Deliverable 1 Final and Deliverable 3 Draft Due**
9	March	28	2025	Traffic Drawings • Using the MUTCD • Drawing signs and striping
10	April	4	2025	Work Session **Deliverable 2 Final and Deliverable 4 Draft Due**
11	April	11	2025	Public Outreach ○ Community meetings ○ Social media campaigns **Deliverable 3 Final Due**
12	April	18	2025	Presentation Prep
13	April	25	2025	Presentation Prep
14	May	2	2025	**Class presentations** **Deliverable 4 Final and Deliverable 5 Due**
15	May	9	2025	**Deliverable 6 Due**

Grading Policy:

- Periodically you will receive individual homework assignments. These will be graded individually and will collectively be worth 10% of your grade.
- Deliverables 1-4: One document will be submitted per group per deliverable. The deliverables will collectively be worth 30% of your grade. Your response to comments will play a role in determining the grade of each deliverable.
- Deliverable 5: Feedback on each group's presentation will be provided. The grade will be based on a combination of substance, presentation delivery, and the ability to keep the audience engaged. This will be worth 30% of your grade.
- Deliverable 6: The Transportation Management Plan, of which one will be submitted per group, will be reviewed to ensure completeness and effectiveness of mitigation, implementation, and outreach strategies. This will be worth 30% of your grade.

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:

Attendance is mandatory for all classes.

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:

- Deliverable 1: Data collection and summarization (Draft technical memorandum due Class 5; final due Class 8)
    - Each group will submit a technical memorandum on how they used the data provided. Each group will describe how they summarized raw data that has been provided to them as a part of this class. Each group will explain how they accounted for variation in hour, day, and month to annualize the volumes. The memo will also include a balanced traffic network and the quality plan Each group is following.
- Deliverable 2: Analysis of Existing Conditions (Draft technical memorandum due Class 7; final due Class 10)
    - Each group will model existing, conditions in Synchro. Each group will calibrate and validate existing conditions. Each group will submit a technical memorandum detailing the results of existing conditions as well as the calibration and validation methodology used.
- Deliverable 3: Analysis of No Build Conditions, and Trip Diversions (Draft technical memorandum due Class 8; final due Class 11) ○ Each group will grow existing volumes to the ETC year using historical data. Each group will perform analysis of No Build conditions in Synchro. Each group will utilize provided origin/destination data to create a diversion program and will reassign trips elsewhere through the roadway network. Each group will document the No Build results and diversion methodology in a technical memorandum.
- Deliverable 4: Analysis of Build and Proposed Mitigation (Draft technical memorandum due Class 10; final due Class 13) ○ Each group will analyze the Build conditions in Synchro and will atteBuild to mitigate as many impacts as feasible. Each group will document the mitigation measures and analysis results in a technical memorandum.
- Deliverable 5: Class presentation
    - Each group will provide a presentation in Class 13. The presentation will detail the analysis methodology and results, describe the mitigation measures, how to implement the measures, and a community outreach strategy.
- Deliverable 6: Transportation Management Plan (Due Class 14) ○ Each group will formulate a technical memorandum that details a transportation management plan that contains the results of the analysis and mitigation measures. The plan will also include active strategies to implement these mitigation measures. The plan will also include a plan for community outreach.

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:

Please contact Dr. Veeregowda at bkv4@njit.edu with any questions you may have.

Items Required for this Course:

N/A

Dress Policy:

N/A

Outcomes Course Matrix –

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1:			
Present an innovative transportation management plan that saves time and money while minimizing impacts to a real-world situation.	1,2,7	1,2	Deliverables 1-4, 6
Student Learning Outcome 2:			
Understanding impact assessment criteria and measures of effectiveness	2,4	1,2	Deliverables 1-4, 6
Student Learning Outcome 3:			
Work individually and within multi-disciplinary design teams	3,5	1,2	Deliverables 1-6

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 scholarships among our faculty and students
- to promote service to the engineering profession and society

Program Educational Objectives

Our **Program Educational Objectives** are reflected in the achievements of our recent alumni:

- **Engineering Practice:** Alumni will successfully engage in the ethical practice of civil engineering within industry, government, and private practice, working towards safe, practical, resilient and sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.
- **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 academia, business, and law through further education.
- **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.

Student Outcomes

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 conclusion
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated 1/6/2025