Description:
This course introduces the profession of traffic engineering and its components. The impact of road users, vehicles, roadways, and control devices on traffic operations is discussed. Quantification of traffic stream characteristics is treated in detail. The critical differences between traffic demand, traffic volume or flow, and capacity are treated. The design and use of traffic control devices, including signal timing for pre-timed and actuated signals, is covered in detail. Signal coordination on arterials and in networks introduced. An introduction to the subjects of highway capacity and level of service analysis, traffic safety analysis and programs, and safety mitigation measures is also included.

Course Objectives:

1. Students should understand how traffic streams are quantified, and how to use traffic stream data to understand underlying traffic problems.
2. Students should be able to develop signal timing plans for intersections for both pre-timed and actuated signals.
3. Students should understand the importance of highway traffic safety as an over-riding professional obligation.
4. Students should understand the concepts of traffic demand, traffic volume, capacity, and level of service, and perform simple analyses of these characteristics.

Course Outcomes of the Accreditation Board for Engineering and Technology (ABET):
This course touches on most of the course outcomes required by ABET in some way. Three are addressed in great detail within the course:

A. An ability to apply knowledge of mathematics, science, and engineering.
   *Traffic engineering involves analytic models of traffic behavior and their manipulation to create physical and signal timing designs.*

C. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability.
   *Design and application of control devices, along with rudimentary geometric design of facilities are applied to obtain safe and cost-effective solutions to traffic problems.*

E. An ability to identify, formulate, and solve engineering problems.
   *Traffic problems include the amelioration of congestion, provision for safe and efficient movement of vehicles (and the people and goods they carry) on surface and grade-separated facilities, provision of access to abutting lands to support development, and many others. Most problems involve more than one element which must be solved by the traffic engineer.*

Instructor:
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Textbook:
Note: You must have the 4th Edition of the text. Many changes have been made from previous editions based upon the latest methodologies used in the profession. If you acquire a used textbook from the 1st printing, there is an errata posted on the course website that you should download and keep with the text. Later printings have been corrected.

Supplementary Materials:


Supplementary notes to be posted on the course web-site.

Grading Policies:
The final course average is based upon the following:

Midterm 20%
Final Exam: 25%
Homework: 30% (6 assignments, 5% each)
Group project: 25% (group presentation: 10%, final report: 15%)

Midterm and Final Examination: The midterm covers material from the first half of the semester; the final covers material from the second half of the semester. Students are allowed 1 “cheat” sheet, 8.5x11, double-sided, to bring to the exam. I will also provide a formula sheet in the exam (which I will provide to you one week in advance).

Homework:
Homework problems are assigned every other week. The course schedule (attached) shows the assignments and their due dates. Homework solutions will be posted on the course website the day after they are due. No late homework will be accepted after posting of the solutions. An unsubmitted homework earns a “0” grade. The following rules for homework submittals must be followed:

1. Homework sets must be submitted in a professional-looking format, via NYU Classes as a PDF. I will return grades via NYU Classes and provide comments on your assignment there.
2. Many problems may be efficiently solved using a spreadsheet. Embed the spreadsheet as a screenshot (make sure to zoom to make it fit properly) in the report.
3. Students may collaborate on doing the homework. However, each student must write up and submit their own solution. Multiple copies of a word-processed solution set with different names are not permitted and will get zero. CHEATING AND PLAGIARISM WILL NOT BE TOLERATED. (if you are unclear, please refer to this page: http://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/academic-integrity-for-students-at-nyu.html)

Preparing for the Fundamentals of Engineering Exam

An important milestone in a transportation engineer’s career is passing the FE exam. The transportation portion of the exam covers several topics in highway geometric design, traffic engineering, and pavement design. This course covers the traffic engineering portion, which
includes the fundamental traffic flow characteristics; queueing; traffic control design and operations; traffic data collection, monitoring, and analysis; and traffic safety analysis. I will make sure to point out the material that is particularly relevant to study for the FE exam.

**Moses Center Statement of Disability**

If you are student with a disability who is requesting accommodations, please contact New York University’s Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.

**Tentative Course Schedule for Spring 2017**

CE-UY 3303 meets on Tuesdays and Thursdays from 4:00 PM to 5:20 PM in RH602

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Text Ch.</th>
<th>HW Due</th>
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<tbody>
<tr>
<td>1 (1/24)</td>
<td>Intro, Science: basics of traffic flow theory, traffic fundamental diagram, flow and load capacities</td>
<td>5</td>
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<tr>
<td>2 (1/31)</td>
<td>Science: Greenshield’s model, Lighthill-Whitham-Richards model, time-space diagrams, shockwave analysis</td>
<td>6</td>
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<tr>
<td>3 (2/7)</td>
<td>Monitoring: Volume/capacity over time, Space mean speed, inductive loop detectors, speed studies, GPS data</td>
<td>5, 8, 9</td>
<td>HW1 due 2/6</td>
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<tr>
<td>4 (2/14)</td>
<td>Evaluation: highway and freeway capacity level of service, traffic safety analysis</td>
<td>11, 13, 14</td>
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<tr>
<td>5 (2/21)</td>
<td>Control: safety treatments, volume/capacity</td>
<td>16, 6</td>
<td>HW 2 due 2/20</td>
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<tr>
<td>6 (2/28)</td>
<td>Control: queue delays, incident detection algorithms</td>
<td>6</td>
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<td>7 (3/7)</td>
<td>MIDTERM review on 3/7, MIDTERM on 3/9.</td>
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<td>HW 3 due 3/6</td>
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<td>8 (3/14)</td>
<td>SPRING BREAK</td>
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<tr>
<td>9 (3/21)</td>
<td>Science: Sight distance, stochastic queueing, signal warrants, Traffic control devices, dual-ring signal control</td>
<td>6, 18, 21</td>
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<tr>
<td>10 (3/28)</td>
<td>Highway Capacity Software tutorial; Monitoring: intersection LOS survey</td>
<td>24</td>
<td>HW 4 due 3/31</td>
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<tr>
<td>11 (4/4)</td>
<td>Control: pre-timed signal control design, cycle length, dilemma zone</td>
<td>20, 24</td>
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<tr>
<td>12 (4/11)</td>
<td>Aimsun microsimulation demonstration; Evaluation: HCM unsignalized intersection</td>
<td>21</td>
<td>HW 5 due 4/15</td>
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<tr>
<td>13 (4/18)</td>
<td>Evaluation: HCM signalized intersections</td>
<td>21</td>
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<tr>
<td>14 (4/25)</td>
<td>Control: actuated signals, coordinated signals, Robertson’s platoon, SCOOT/SCATS</td>
<td>22, 26</td>
<td>HW 6 due 4/28</td>
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<tr>
<td>15 (5/2)</td>
<td>GROUP PROJECT PRESENTATIONS on 5/2. FINAL EXAM review on 5/4, FINAL REPORTS due 5/5.</td>
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<tr>
<td>5/10-5/16</td>
<td>FINAL EXAM (date/time/loc TBD)</td>
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**Note:** This schedule is approximate, and will be altered to reflect actual progress in the classroom. Changes will be posted on the course web-site. The reading material is also approximate. I will point out in my lecture notes precisely the reading source for reference.