Course Objectives

The main objective of this course is to introduce Civil Engineering students to the basic concepts and techniques of Highway and Transportation Engineering. Emphasis is placed on the components of the highway system, i.e., driver, vehicle, structure and the interaction between them as related to the design, construction, operation and maintenance of the highway system.

Course Outline:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Chapter</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction: Importance of Transportation, Road Classification, Road Classification in Canada</td>
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<td>1,2</td>
<td>Driver, Vehicle, and Road Characteristics: The Human Response Process, Older Drivers, Pedestrians and Bicyclists, Resistance to Movement, Braking Distance, Minimum Curvature of a Horizontal Curve, Sight Distance</td>
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<td>3</td>
<td>Traffic Engineering Studies: Spot Speed, Volume, Travel Time and Delay, Parking</td>
<td>4</td>
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<td>4</td>
<td>Highway Safety: Issues Involved in Transportation Safety, Strategic Highway Safety Plans, Effectiveness of Safety Design Features</td>
<td>5</td>
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<td>5,6</td>
<td>Intersection Design and Control: Types of Intersections, Design Principles for At-Grade Intersections, Sight Distance at Intersections, Conflict Points at Intersections, Signal Timing</td>
<td>7-8</td>
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<td>7,8</td>
<td>Highway Capacity and Level of Service: Traffic Flow Elements, Fundamental Diagram of Flow, Two-Lane Highways, Multilane Highways, Basic Freeway Sections</td>
<td>6,9</td>
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<tr>
<td>8</td>
<td>&lt;&lt;&lt;&lt;&lt;&lt;&lt; Tentative Date for Midterm Examination: Mar 8, 10, or 11 &gt;&gt;&gt;&gt;&gt;&gt;&gt;</td>
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<td>9</td>
<td>Geometric Design: Highway Location, Highway Design Standards, Cross-Section Elements, Vertical Alignment, Horizontal Alignment, Design Consistency</td>
<td>14-15</td>
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<td>10</td>
<td>Highway Materials: Soil Characteristics, Frost Action, Bituminous Materials, Superpave Asphalt Binder Grading, Asphalt Concrete, Asphalt Concrete Mix Design</td>
<td>17-18</td>
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<td>11,12</td>
<td>Structural Design: Flexible Pavement, AASHTO Design Method, Rigid Pavement, PCA Design Method, Mechanistic-Empirical Pavement Design</td>
<td>19-20</td>
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<tr>
<td>12</td>
<td>Pavement Maintenance and Rehabilitation: Pavement Evaluation, Maintenance and Rehabilitation Techniques</td>
<td>21</td>
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Marking Scheme:

- Bi-weekly Problem Sets: 20%
- Participation/Quizzes: 5%
- Midterm: 25%
- Final Examination: 50%
- Total: 100%
Course Instructor:

Dr. Y. Hassan
Room 3442 ME
Phone: 8625
E-mail: yasser_hassan@carleton.ca

Text:


Notes:

– The instructor may alter the course outline and/or the marking scheme depending on the class performance.
– The evaluation of course participation will be based on student’s involvement in discussions, answering questions, and responding to surveys in the lectures. Students’ responses will require the use of clickers, which can be obtained on a loan-basis from CUOL.
– The clicker responses must be made only by the student whose ID is associated with that clicker.
– Considerable percentage of the mark will be deducted for messy assignments or exams.
– Due dates will be strict. Students who miss an assignment for a legitimate reason must report their reasons as soon as possible.
– There will be no make-up midterm examination. Students who miss the midterm exam for a legitimate reason must report their reasons to the instructor within one week of the date of examination. The weight of the midterm exam for these students will be added to the final exam.
– The final examination is for evaluation purposes only and will not be returned to the student.
– A minimum of 30% (15 out of 50) in the final is required to pass the course.
– Students who perform very poorly during the term (term work less than 30% or 15 out of 50) will be assigned the grade FND (Failure – No Deferred).
– You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:
  – Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://www.carleton.ca/equity/
  – Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://www.carleton.ca/equity/
  – Academic Accommodations for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable) at http://www.carleton.ca PMC/new-and-current-students/dates-and-deadlines/
  – You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at http://www.carleton.ca/equity/