Course Objectives

This is an introductory course to key analytical techniques and design methods of Transportation Engineering and Planning. The course covers the following general topics: transportation and the socio-economic environment, components of transportation systems, different modes of transportation, design controls, fundamentals of vehicle motion, vehicle stability on horizontal curves, design of key highway geometric elements, fundamentals of traffic flow theory, capacity analysis, fundamentals of transportation planning methodologies, introduction to traffic safety analysis, and introduction to transportation impact studies and evaluation techniques of transportation projects.

Course Goals and Learning Objectives:

This course is designed to provide foundational technical, analytical knowledge, skills required in major practice areas of Transportation Engineering and Planning. Following is an outline of the course goals and learning objectives:

<table>
<thead>
<tr>
<th>Course Goal</th>
<th>Related Learning Objectives</th>
<th>Related Chapters</th>
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</thead>
</table>
| Goal 1: Introducing the transportation system | - Identify component of the transportation system.  
  - List different modes of transportation.  
  - Discuss the Functions of each mode in the transportation system. | Ch. 1  
  Ch. 5 |
| Goal 2: Fundamentals of highway geometric design | - Recognize key geometric elements of highways from a designer’s perspective.  
  - Identify main geometric design requirements for key geometric elements and the influence of human factors on geometric design.  
  - Apply models of vehicle motion and stability on horizontal curves.  
  - Differentiate analytical treatments of geometric elements and distinguish contextual variables.  
  - Choose appropriate design models and apply them to solve fundamental problems of horizontal and vertical alignment of highways.  
  - Recognize the importance of alignment coordination as a task in highway design.  
  - Recognize the significance of design consistency on highway design. | Ch. 2 |
| Goal 3: Fundamentals of Traffic Flow Theory | - Recognize and discuss main traffic flow patterns and relationships that govern speeds of moving road users versus their density.  
  - Choose and apply main traffic flow models to predict traffic conditions in some traffic engineering problems; in this course shockwaves and queues formation. | Ch. 3 |
| Goal 4: Fundamentals of Transportation planning and travel demand forecast | - Identify the purpose and goals of the Transportation Planning process.  
  - List and explain the main steps and classic models used in the traditional four-step model for Travel Demand Forecast.  
  - Apply the classic models for demand forecast.  
  - Recognize limitations of this model, devise, and estimate potential improvements. | Ch. 7  
  Ch. 8 |
Goal 5: Learning analytical techniques of common road safety analysis problems
- Discuss the purpose of network screening.
- Recognize the practical challenges of network screening for road safety treatments.
- Apply classic and some specific statistical techniques for network screening.
- Evaluate on logical grounds the effectiveness of each method, recognize their limitations, and estimate potential improvements.

Goal 6: Providing an overview of traffic impact analysis
- Identify and discuss main impacts of transportation projects on the environment.
- Recognize typical approaches to evaluate transportation project alternatives.

Marking Scheme:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Participation/Quizzes</td>
<td>5%</td>
</tr>
<tr>
<td>Midterm</td>
<td>25%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>50%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
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Course Instructor:
Dr. Y. Hassan
Room 3442 ME
Phone: 8625
E-mail: yasser_hassan@carleton.ca

Recommended Textbook:

Notes (Amended):
- The instructor may alter the course outline and/or the marking scheme depending on the class performance.
- *Use of any device to record audio, video, or still images in the classroom is strictly prohibited unless it is explicitly authorized by the instructor.*
- All materials posted on cuLearn are for the exclusive educational purpose by registered students in this course in the designated term and cannot be used for any other purpose.
- The evaluation of course participation will be based on student’s answering questions and responding to surveys in the lectures. Students who cannot use any of the class participation tools (see the following note) in all classes will have all their Participation/Quizzes grade assessed based on the quizzes only.
- In this course, the instructor will be using Poll Everywhere, an audience response system, to ask questions during class. Students will be able to respond to the questions through the use of a web browser on a computer or by SMS text messaging on a cell phone. Students can also download the Poll Everywhere app or respond via Twitter. The website and phone number to text to will be displayed in class. Please note that your phone will be charged regular SMS text fee if you choose to respond by SMS.
- Considerable percentage of the mark will be deducted for messy assignments or exams.
- Assignments are submitted as hardcopies with proper cover page in the designated drop-box before
the due date and time. Assignments that are submitted after (but within 24 hrs of) the due date will have the grade discounted by 20%. No assignments will be accepted after 24 hrs of the due date. Students who miss an assignment for a legitimate reason must report their reasons as soon as possible.

- Students are encouraged to upload a clean and legible softcopy of the assignment on cuLearn as a backup. The softcopy will not be graded or checked. The softcopy cannot be used to establish submission prior to the due date. Exceptions can be granted in cases of extreme difficulty with an arrangement with the course instructor at least 24 hrs before the due date.

- **Tentative date for the midterm exam is Wednesday October 18, 2017.** 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/](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/](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.

  - 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/](http://www.carleton.ca/equity/)