Transportation Engineering II
Modelling, Transit, and ITS
CIV ENG 4T04
Winter 2019

Course Instructor
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1- Course information
Course Name: Transportation Engineering II: Modelling, Transit, and ITS
Course ID: CIV ENG 4T04
Term: Winter 2019
Class Times & location:
- Mondays and Thursdays, 12:30-13:20 at CNH-103
- Tuesdays, 13:30-14:20 at CNH-103
Tutorial Time & location:
- Friday, 08:30-10:20 at JHE-A102
Winter Term Dates: January 7 – April 9, 2019
Office Hours: By appointment

2- Course Overview
This course builds on the materials offered in 3K03 “Introduction to Transportation Engineering” and covers transportation modelling, basic transit engineering concepts, and Intelligent Transportation Systems (ITS). The course is developed in three overarching themes. Theme one focuses on transportation modelling at the Micro, Meso, and Macro levels as well as the associated software applications. Theme two introduces transit modelling and operation and reviews the modelling approaches for ridership estimation. Theme three offers a detailed review on the data collection, design, and operation of ITS. These three themes will be incorporated into bi-weekly problem sets and a team project that will focus on:
- Dynamic operational modelling (Meso/Micro simulation)
- Intelligent Transportation Systems (ITS) strategies and mathematical models
- Transit engineering operations and planning
The term project group will consist of a complete design project focusing on a public transit system: LRT and HSR. This group project will serve as the backdrop to essentially tie-in all of the concepts learned within the course.

3- Transportation Software
During the course, students will have the opportunity to learn two fundamental simulation tools: Synchro Traffic Simulation and Remix Transit Simulation (industrial based transit software). These tools will equip students with advanced knowledge that is highly valued in the transportation industry.

4- Intended Learning Outcomes (ILOs)
Upon successful completion of this course, you will be able to:
- Identify all four stages of the Urban Transportation Modelling System (UTMS) for the purposes of traffic demand forecasting in the event of new developments [CEAB Indicator 1.4]
- Perform the necessary calculations for each stage of the UTMS to estimate the trips generated at a specific site, the expected modal split, trip distribution and trip assignment [CEAB Indicator 1.3]
- Assess the level of service of signalized intersections and to determine optimal transit and traffic signal timing plans via calculation and micro simulation [CEAB Indicators 1.4 and 7.1]
- Apply the fundamental principles of traffic flow theory and the associated specialized traffic and transit engineering knowledge to solve unfamiliar problems pertaining to new developments or
implementation of different traffic control strategies in transportation design [CEAB Indicator 3.2] By achieving these objectives, you will be able to contribute meaningfully to the work that transportation engineers do, whether in a design office, government technical services, or in academia.

5- CEAB* Graduate Attributes and Indicators
Through this course, you will develop in the following graduate attributes and indicators:
1. A knowledge base for engineering (Demonstrated competence in university-level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program.)
   1.3 Competence in Engineering Fundamentals
   1.4 Competence in Specialized Engineering knowledge
2. Problem analysis (An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions.)
   2.1 Demonstrates an ability to identify reasonable assumptions (including identification of uncertainties and imprecise information) that could or should be made before a solution path is proposed.
   2.3 Obtains substantiated conclusions as a result of a problem solution including recognizing the limitations of the solutions.
3. Investigation (An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data, and synthesis of information in order to reach valid conclusions.)
   3.2 Selects appropriate model and methods and identifies assumptions and constraints.
7. Communication Skills (An ability to communicate complex engineering concepts within the profession and with society at large. Such abilities include reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.)
   7.1 Demonstrates an ability to respond to technical and non-technical instructions and questions.
* Canadian Engineering Accreditation Board

6- Course Outline
The course outline is structured around three main themes that span over Modelling, Transit, and ITS.

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7- Course Materials
Lecture Notes Lecture notes, assignment, and exercises will be made available through Avenue to Learn.

Text Book  Required


Supplementary Optional Reading

8- Assignments, Projects, and Exercises
Exercise 1-5 Exercises will be assigned bi-weekly
Assignment 1 Project-based, Transportation System Design (Due on Week 12)
Mid-Term Theoretical Concepts & Working exercise (Week 7 – Tutorial Session - BSB 117)

Detailed guidelines for each assignment/exercise will be available on Avenue to Learn.

9- Evaluation
The final mark for this course will be determined as follows:
Exercises (1-5) 5 * 5.0% each 25%
Project 25%
Project Presentation 05%
Mid-term 15%
Final Exam 30%
Total 100%

10- Deadlines and Late Penalties
In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work” (MSAF). Please note these regulations have changed beginning Fall 2015. When using the MSAF, report your absence to mmohame@mcmaster.ca and directly to your supervisor. Absences lasting more than three days must be reported to the Associate Dean’s Office (KTH-129 for Social Science students, BSB-129 for Science students, and JHE-A214 for Engineering Students) and appropriate documentation must be provided.

For medical absences, the University reserves the right to require students to obtain medical documentation from the Campus Health Centre. Please note that this form is simply a request for relief, the nature of the relief is left to the instructor’s /supervisor’s discretion. Once the form is filled out, the student must
contact their supervisor and the course instructor (mmohame@mcmaster.ca) as soon as possible in order to make necessary arrangements for making up work.

Generally, the accommodation will be to grant an extension which matches the length of the absence, at the discretion of the supervisor and in consultation with the course coordinator.

Please review the University’s policy on missed term work that is available at:
http://academiccalendars.romcmaster.ca/content.php?catoid=7&navoid=559

Late submissions that are not subject to the aforementioned criteria will lose 5% of the assignment/exercise grade for every late business day.

11- Communication, Discussion, and Feedback

All formal communications regarding this course will be through McMaster email accounts and/or Avenue to Learn. Please be sure to check your McMaster account regularly. If you have not received emails regarding 4T04, it is your responsibility to contact the course coordinator with your McMaster email address and ensure your name is on the distribution list. Similar information will be posted on Avenue to Learn.

Email subject line must start with the course number followed by a colon and includes a relevant description of the content in the e-mail (e.g. 4T04: Assignment 1 question).

Following this policy, students may expect a response from the TAs within two business days, or from the instructor in three business days. Emails that do not follow this policy may not receive a response.

You are encouraged to discuss the feedback that you receive on your assignments with the course TA and the course instructor. If you believe that you have received incorrect grades, you must contact the teaching team immediately with a written explanation. This process should be no later than one week of the day that the assignment was returned.

Periodically, you will be asked to provide feedback on your own experience during this course, including your opinion on the effectiveness of the lectures, tutorials, and assignments in contributing to your learning. This feedback will be solicited to help improve your experience, so it is in your best interest to make this feedback as informative, constructive, and respectful as possible.

12- Accessibility

Students with diverse learning styles and needs are welcome in this course. If you have a health consideration that may require accommodations, please contact Student Accessibility Services (SAS, http://sas.mcmaster.ca) as soon as possible. We are happy to work with SAS to provide the necessary accommodations for you to achieve your Intended Learning Outcomes (ILOs) for this course.

13- Academic Integrity

You are expected to exhibit honesty and use ethical behavior in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behavior can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at: http://www.mcmaster.ca/academicintegrity

The following illustrates only three forms of academic dishonesty:
1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained,
2. Improper collaboration in group work,
3. Copying or using unauthorized aids in tests and examinations.

In this course, we will be using Avenue to Learn. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, usernames for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the Course Administrators.

14- Professional Class Conduct
Attending lectures and tutorials is mandatory.
Our goal is to provide an environment that is free of discrimination and harassment, as well as that supports you to become competent in transportation engineering. Therefore, we have the following expectations;

- Lectures should be treated as discussion sessions, please be prepared to work, and participate actively in every meeting
- Please arrive on time, and minimize disruption if you are late
- You are encouraged to ask questions related to the content of this course
- Please avoid eating during class if possible, breaks will be provided
- Please make sure all your electronic devices (e.g. cell phones and mp4 players) are on silent mode
- If you urgently need to leave the class, please do it quietly to minimize disruption
- Do not use electronics for leisure. Do not text, reply to e-mails, browse the internet, or listen to music during lecture. PLEASE use your device to take notes
- If you wish to use a device to take notes, please sit to the side of the lecture hall to avoid distracting others behind you
- If you are bothered by the actions of others around you, please let me know so that I may justly address your concerns as soon as possible
- Additional aspects will be discussed in Week 1

15- In-class Participation
During this course, you will be asked to answer some questions to submit an “exit ticket” at the end of lectures. This will probably all be done using the application “Socrative”, which is free to download and use from Apple App Store, Google Play Store, and Microsoft Store. Your participation in this process is not mandatory (i.e. you will not lose marks for choosing not to participate), but it is very important for providing the course instructor feedback on your learning. To motivate students to participate in this process, 1% bonus will be awarded based on the level of participation.

Questions posed during lectures will be both quantitative (requiring simple calculation) and qualitative (requiring an extra bit of thinking). You are expected to have the required tools with you during lecture such that you may answer these questions in a timely manner.

Please Note that
The instructor and the University reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes.