

Western University - Faculty of Engineering
Department of Civil and Environmental Engineering

CEE 4401A – Principles of Transportation Engineering - Course Outline 2017

This course introduces fundamental principles in the area of transportation engineering. The primary course objectives are to:

1. provide students with a basic understanding of the principles of transportation engineering and planning.
2. illustrate the principles of transportation engineering, using practical applications and case studies.
3. encourage critical thinking and motivate students to carry out research in various areas of transportation engineering.

Calendar Copy:

Principles of transportation engineering and planning, including: vehicle motion and human factors, geometric design, design consistency, traffic modeling, capacity and level of service, transportation planning, transportation management, simulation and transportation impact studies. Practical applications and case studies are emphasized.

Prerequisites: CEE 3369A/B

Antirequisites:

Note: It is the student's responsibility to ensure that all Prerequisite and Corequisite conditions are met or that special permission to waive these requirements has been granted by the Faculty. It is also the student's responsibility to ensure that they have not taken a course listed as an Antirequisite. The student may be dropped from the course or not given credit for the course towards their degree if they violate the Prerequisite, Corequisite or Antirequisite conditions.

Instructor:

Dr. Faisal Ahmed, EIT, PMP

Office:

Phone:

Email: fahme27@uwo.ca

Office hours:

Textbook:

Papacostas, C.S. and Prevedouros, P.D. Transportation Engineering & Planning. Third Edition, Prentice Hall, Upper Saddle River, N.J. 2001.

Other References:

1. Transportation Association of Canada. Geometric design guide for Canadian roads. TAC, Ottawa, Ontario (revised 2017).
2. Highway Capacity Manual 2010, Transportation Research Board.

Units:

Both SI and FPS unit systems may be used in lectures, tutorials and examinations.

Specific Learning Objectives:

At the end of this course, the successful student will have following graduate attributes:

- Develop knowledge base in highway geometric design and safety, traffic engineering and transport planning application areas.
- Develop depth of knowledge in highway alignments, transport planning and simulations, and traffic impact study using a four-step transport planning model.
- Develop critical thinking and problem solving skills.
- Use specific traffic software (Synchro and SimTraffic) to solve transportation engineering, planning and operations applications.

Course Organization:

3 hours of lecture day, 2 days per week for 7 weeks, in 1 section

3 hours of of lab/tutorial day, 2 days per week for 7 weeks, in 1 section

General Learning Objectives:

E=Evaluate, T= Teach, I= Introduce

Problem Analysis	E	Team Work		Ethics and Equity	
Investigation		Communication		Economics and Project Management	
Design	T	Professionalism		Life-long Learning	
Engineering Tools	E	Impact on Society			

Evaluation:

Assignments (4)	20%
Quizzes (5)	10%
Project (1)	20%
Final exam	<u>50%</u>
Total	100%

Note: Students must pass the final examination to pass this course. Students who fail the final examination will be assigned the aggregate mark, as determined above, or 48%, whichever is less. Students who have failed this course previously must repeat all components of the course. No special permissions will be granted enabling a student to retain laboratory, assignment or test marks from previous years. Previously completed assignments and laboratories cannot be resubmitted.

Examination, Assignments, Quizzes and Project:

Final exam: during exam period, three hours, closed-book with cheat sheets. The exam covers the whole course materials. Questions are mixed with multiple choices and problem solving.

Quizzes: Five quizzes, closed-book, based on class-lectures of at least two weeks, comprised of multiple choices and/or problem solving.

Assignments: Four assignments, all Assignments must submit electronically before the set deadline.

Project: An individual project of Traffic Impact Study (TIS) that combines some aspects of geometric design and transport planning applications combined in a report. The lab/tutorial contents are designed to develop the individual components of this TIS project.

Course Content and Tentative Schedule:

Week	Subject	Chapter(s)
1	General information, course objective, course outline Introduction to Transportation Systems Characteristics Classifications Mathematical Models Modes	1, 5
2	Design Basics Vehicle motion Human factors <i>[In-class quiz 1]</i>	2
3	Highway Geometric Design Cross section, Horizontal Alignment, Vertical Alignment	-
4	Sight distance, Design process, Intersections	2
5	Highway Design Consistency Cross section consistency, Operating speed consistency, safety and consistency <i>[In-class quiz 2]</i>	3
6	Traffic Stream Flow Models Vehicle stream models Stream equations and diagrams Measurements and estimation	4
	<i>Study Week</i>	
7	Capacity and Level of Service Capacity of roadway facilities Transit system <i>[In-class quiz 3]</i>	4
8	Design of Signal Systems Signal phases and signal timing parameters	-
9	Transportation Planning Introduction Trip generation Trip distribution	7
10	Mode choice Traffic Assignment <i>[In-class quiz 4]</i>	8
11	Queuing and simulation Queuing models Computer simulations (Monte Carlo)	14
12	Transportation Impacts Traffic Impact Studies Evaluation of alternatives <i>[In-class quiz 5]</i>	9, 11
13	Transportation System Management Review of all class contents	-

Lab/Tutorial Content and Tentative Schedule:

Week	Subject
1	Basics of transportation engineering applications and software
2	Basic modeling of transportation facilities (in Synchro)
3	Alignments of curves: Horizontal and Vertical
4	Traffic count, PHF, and estimation of 85 th percentile speed
5	Modeling of link travel time and its variations, BPR function
6	Modeling of unsignalized intersections, Signal warrants
	Study week
7	Level of Service (LOS) of different transportation facilities
8	Signal phases, and signal timing parameter optimizations
9	Trip generation and trips distributions
10	Modal splits and assignments
11	Development of link and intersection mitigation measures
12	Review of lab/tutorial contents

Use of English:

In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for improper use of English. Additionally poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

Cheating:

University policy states that cheating is a scholastic offence. The commission of a scholastic offence is attended by academic penalties that might include expulsion from the program. If you are caught cheating, there will be no second warning.

For more information on scholastic offenses, please see:

http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf

Attendance:

Any student who, in the opinion of the instructor, is absent too frequently from class, laboratory, or tutorial periods will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular final examination in the course.

Accessibility:

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Conduct:

Students are expected to arrive at lectures on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others. Please turn off your cell phone before coming to a class, tutorial, quiz or exam. On the premises of the University or at a University-sponsored program, students must abide by the Student Code of Conduct:

<http://www.uwo.ca/univsec/board/code.pdf>

Sickness and Other Problems:

Students should immediately consult with the Instructor or Department Chair if they have any problems that could affect their performance in the course. Where appropriate, the problems should be documented (see attached). The student should seek advice from the Instructor or Department Chair regarding how best to deal with the problem. Failure to notify the Instructor or Department Chair immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

Students that are in emotional/mental distress should refer to Mental Health@Western

<http://www.uwo.ca/uwoom/mentalhealth/> for a complete list of options about how to obtain help

For more information concerning medical accommodations, please see:

http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf

Notice:

Students are responsible for regularly checking their email, course website (<https://owl.uwo.ca>) and notices posted outside the Civil and Environmental Engineering Department Office

Consultation:

Students are encouraged to discuss problems with their teaching assistant and/or the Instructor in tutorial sessions. Office hours will be arranged for the students to see the Instructor and teaching assistants. Other individual consultation can be arranged by appointment with the instructor.

Course Breakdown: (Values given in accreditation units)

Engineering Science 75%, Engineering Design 25%

The attached document “INSTRUCTIONS FOR STUDENTS UNABLE TO WRITE TESTS OR EXAMINATIONS OR SUBMIT ASSIGNMENTS AS SCHEDULED” is part of this course outline.

INSTRUCTIONS FOR STUDENTS UNABLE TO WRITE TESTS OR EXAMINATIONS OR SUBMIT ASSIGNMENTS AS SCHEDULED

IF, ON MEDICAL OR COMPASSIONATE GROUNDS, YOU ARE UNABLE TO WRITE TERM TESTS OR FINAL EXAMINATIONS OR COMPLETE COURSE WORK BY THE DUE DATE, YOU SHOULD FOLLOW THE INSTRUCTIONS LISTED BELOW. YOU SHOULD UNDERSTAND THAT ACADEMIC RELIEF WILL NOT BE GRANTED AUTOMATICALLY ON REQUEST. YOU MUST DEMONSTRATE TO YOUR DEPARTMENT (OR THE UNDERGRADUATE SERVICES OFFICE) THAT THERE ARE COMPELLING MEDICAL OR COMPASSIONATE GROUNDS THAT CAN BE DOCUMENTED BEFORE ACADEMIC RELIEF WILL BE CONSIDERED. DIFFERENT REGULATIONS APPLY TO TERM TESTS, FINAL EXAMINATIONS AND LATE ASSIGNMENTS. PLEASE READ THE INSTRUCTIONS CAREFULLY. (SEE THE 2017 UWO ACADEMIC CALENDAR).

A. GENERAL REGULATIONS & PROCEDURES

1. All first year students will report to the Undergraduate Services Office, SEB 2097, for all instances.
2. If you are an upper year student and you are missing a test/assignment/lab or exam that is worth MORE THAN 10% of your final grade, you will report to the Undergraduate Services Office, SEB 2097. Otherwise, you will report to your department office to request relief.
3. Check the course outline to see if the instructor has a policy for missed tests, examinations, late assignments or attendance.
4. Documentation must be provided as soon as possible. If no one is available in your Department office or the Undergraduate Services Office, leave a message clearly stating your name & student number and reason for your call. The department telephone numbers are given at the end of these instructions.
5. If you decide to write a test or an examination you should be prepared to accept the mark you earn. Rewriting tests or examinations or having the value of a test or examination reweighted on a retroactive basis is not permitted.

B. TERM TESTS

1. If you are in first year and you are unable to write a term test, contact the Undergraduate Services Office, SEB 2097 PRIOR to the scheduled date of the test.
2. If you are an upper year student and you are unable to write a term test, inform your instructor PRIOR to the scheduled date of the test. If the instructor is not available, leave a message for him/her at the department office. If the test is worth MORE THAN 10% of your final grade you will report to the Undergraduate Services Office, SEB 2097 to request relief. Otherwise, you will report to your department office to request relief.
3. Be prepared to provide supporting documentation to the Department Chair and/or the Undergraduate Services Office (see next page for information on documentation).
4. Discuss with the instructor if and when the test can be rescheduled. **N.B.** The approval of the Chair or the Undergraduate Services Office is required when rescheduling term tests.

C. FINAL EXAMINATIONS

1. If you are unable to write a final examination, contact the Undergraduate Services Office PRIOR TO THE SCHEDULED EXAMINATION TIME to request permission to write a Special Final Examination. If no one is available in the Undergraduate Services Office, leave a message clearly stating your name & student number.
2. Be prepared to provide the Undergraduate Services Office with supporting documentation (see next page for information on documentation) the next day, or as soon as possible (in cases where students are hospitalized). The following circumstances are not considered grounds for missing a final examination or requesting special examinations: common cold, sleeping in, misreading timetable and travel arrangements.
3. In order to receive permission to write a Special Examination, you must obtain the approval of the Chair of the Department **and** the Associate Dean and in order to apply you must sign a "Recommendation for a Special Examination Form" available in the Undergraduate Services Office. The Undergraduate Services Office will then notify the course instructor(s) and reschedule the examination on your behalf.

N.B. It is the student's responsibility to check the date, time and location of the Special Examination.

D. LATE ASSIGNMENTS

1. Advise the instructor if you are having problems completing the assignment on time (**prior** to the due date of the assignment).
2. Be prepared to provide documentation if requested by the instructor (see reverse side for information on documentation).
3. If you are granted an extension, establish a due date. The approval of the Chair of your Department (or the Associate Dean if you are in first year) is not required if assignments will be completed prior to the last day of classes.
4.
 - i) Extensions beyond the end of classes must have the consent of the instructor, the department Chair and the Associate Dean. Documentation is mandatory.
 - ii) A Recommendation of Incomplete Form must be filled out indicating the work to be completed and the date by which it is due. This form must be signed by the student, the instructor, the department Chair and the Associate Dean.

E. SHORT ABSENCES

If you miss a class due to a minor illness or other problem, check your course outlines for information regarding attendance requirements and make sure you are not missing a test, laboratory or assignment. Cover any readings and arrange to borrow notes from a classmate.

F. EXTENDED ABSENCES

If you are absent more than one week or if you get too far behind to catch up, you should consider reducing your workload by dropping one or more courses. (Note drop deadlines listed below). You may want to seek advice from the academic counsellor in your Department or Ms. Karen Murray in the Undergraduate Services Office, if you are in first year.

G. DOCUMENTATION

If you consulted an off-campus doctor or Student Health Services regarding your illness or personal problem, **you must provide the doctor with a Student Medical Certificate** to complete at the time of your visit and then bring it to the Department (or the Undergraduate Services Office). **This note must contain the following information: severity of illness, effect on academic studies and duration of absence. Regular doctor's notes will not be accepted; only the Student Medical Certificate will be accepted.**

In Case of Serious Illness of a Family Member: Provide a Student Medical Certificate to your family member's physician to complete and bring it to the Department (or the Undergraduate Services Office if you are in first year).

In Case of a Death: Obtain a copy of the death certificate or the notice provided by the funeral director's office. You must include your relationship to the deceased and bring it to the Department (or the Undergraduate Services Office if you are in first year).

For Other Extenuating Circumstances: If you are not sure what documentation to provide, ask the Departmental Office (or the Undergraduate Services Office if you are in first year) for direction.

Note: Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence (see below).

H. ACADEMIC CONCERNS

1. You need to know if your instructors have a policy on late penalties, missed tests, etc. This information may be included on the course outlines. If not, ask your instructor(s).
2. **You should also be aware of attendance requirements in some courses. You can be debarred from writing the final examination if your attendance is not satisfactory.**
3. If you are in academic difficulty, check out the minimum requirements for progression in the calendar. If in doubt, see your academic counsellor.

Calendar References: Check these regulations in your 2017 Western Academic Calendar available at www.westerncalendar.uwo.ca.

Absences Due to Illness: <http://westerncalendar.uwo.ca/2017/pg117.html>
Academic Accommodations for Students with Disabilities: <http://westerncalendar.uwo.ca/2017/pg118.html>
Academic Accommodations for Religious or Holy Days: <http://westerncalendar.uwo.ca/2017/pg119.html>
Course Withdrawals: <http://westerncalendar.uwo.ca/2017/pg157.html>
Examinations: <http://westerncalendar.uwo.ca/2017/pg129.html>
Scheduling of Term Assignments: <http://westerncalendar.uwo.ca/2017/pg135.html>
Scholastic Offences: <http://www.westerncalendar.uwo.ca/2017/pg111.html>
Student Medical Certificate: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf
Engineering Academic Regulations: <http://www.westerncalendar.uwo.ca/2017/pg1442.html>

Note: These instructions apply to all students registered in the Faculty of Engineering regardless of whether the courses are offered by the Faculty of Engineering or other faculties in the University.

Drop Deadlines:

First term half course (i.e. "A" or "F"):	November 5, 2017
Full courses and full-year half courses (i.e. "E", "Y" or no suffix):	November 30, 2017
Second term half or second term full course (i.e. "B" or "G"):	March 7, 2017

Contact Information:

Undergraduate Services Office:	SEB 2097	Telephone: (519) 661-2130	E-mail: engugrad@uwo.ca
Dept. of Chemical and Biochemical Engineering & Green Process Engineering:	TEB 477	Telephone: (519) 661-2131	E-mail: cbeugrad@uwo.ca
Dept. of Civil and Environmental Engineering:	SEB 3005	Telephone: (519) 661-2139	E-mail: civil@uwo.ca
Dept. of Electrical and Computer Engineering, Software Engineering & Mechatronics Engineering:	TEB 279	Telephone: (519) 661-3758	E-mail: eceugrad@uwo.ca
Dept. of Mechanical and Materials Engineering:	SEB 3002	Telephone: (519) 661-4122	E-mail: mmeundergraduate@uwo.ca