Western University
Faculty of Engineering
Mechatronic Systems Engineering Program

MSE 3381A – Kinematics and Dynamics of Machines

Course Outline 2023-24

Description:

Displacement, velocity, and acceleration analysis of linkages; static and dynamic force analysis of mechanisms; balancing of reciprocating and rotating masses; special-purpose joints and mechanisms.

Contact Hours:

3 lecture hours, 2 tutorial hours per week (11 total tutorials), 0.25 laboratory hours (one 3-hour laboratory session), half course.

Antirequisite:

MME 3381A/B

Prerequisites:

MSE 2213A/B or MME 2213A/B, NMM 2270A/B or the former AM 2270A/B.

Co-requisite:

MME 3381A/B

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This

decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

CEAB Academic Units:

Engineering Science: 75%, Engineering Design: 25%

Recommended Textbooks:

Waldron K.J., Kinzel G.L., Agrawal S.K., Kinematics, Dynamics, and Design of Machinery, 3rd Edition, Wiley, 2016

Required Software:

SIMULIA SolidWorks 2022/2023 (for project)

Other Required References:

None.

Recommended References:

None.

General Learning Objectives (CEAB Graduate Attributes)

Knowledge Base	D	Use of Engineering Tools	D	Impact on Society and the Environment	D
Problem Analysis	D	Individual and Teamwork	D	Ethics and Equity	
Investigation	D	Communication Skills		Economics and Project Management	
Design	D	Professionalism		Life-Long Learning	

Notation: *x* represents the content level code as defined by the CEAB. blank = not applicable; I = introduced (introductory); D = developed (intermediate) and A = applied (advanced).

Topics and Specific Learning Objectives

1. **Planar linkage design**

   At the end of this section, students will be able to:

   a. Understand and assess the functionality of a mechanism (KB3; quizzes, assignments, final exam, project)

   b. Select or design a mechanism for a specific purpose (D1, D2; project)

2. **Graphical position, velocity, and acceleration analysis**

   At the end of this section, students will be able to:

   a. Analyze the position, velocity, and acceleration of a linkage using graphical methods (KB3, PA1, PA2, ET2; quizzes, tutorial assignments, project, final exam)

3. **Techniques in geometric constraint programming**

   At the end of this section, students will be able to:

   a. Analyze the position, velocity & acceleration of a linkage using computational approaches (KB3, PA1, PA2, ET2; quizzes, tutorial assignments, project, final exam)

4. **Model and analyze a mechanism using motion simulation software**

   At the end of this section, students will be able to:

   a. Model and analyze a mechanism using motion simulation software (PA1, PA2, ET1, ET2; project)

   b. Understand the potential errors associated with this method

5. **Fundamentals of mechanisms and machines**

   At the end of this section, students will be able to:

   a. Perform design and analysis of cam- and gear-based mechanisms

   b. Use hand calculations, simulation, and experiments in designing and analyzing machines (I1, I2, PA1, PA2, ET1, ET2; quizzes, project, final exam, lab)

   c. Verify, compare, interpret differences between results obtained through different analyses (I3, PA3, ET1, ET2, CS3; quizzes, project, final exam)

   d. Evaluate the implications of an incorrect mechanism design (PA3; project)

6. **Static and dynamic force analysis of mechanisms**

   At the end of this section, students will be able to:

   a. Perform static and dynamic force analysis of mechanisms (KB3, PA1, PA2, ET2; quizzes, tutorial assignments, project, final exam)

7. **Course Project: Design of a Planar Mechanism**

   a. Manage and apply the principles of effective team interaction: organization, management, and motivation (ITW3; project)

Evaluation

The final course grade will be determined according to the following weighting scheme:

Weekly in-tutorial assignments (8)	10%
Take Home Assignment	5%
SolidWorks motion analysis tutorials (pre-project)	5%
Project	15%
Laboratory session	5%
Two Quizzes (closed book)	20%
Final examination (closed book)	40%

Quizzes, projects, and the lab will be carried out according to the following tentative schedule:

Evaluation Format	Weight	Effort Type	Assigned	Due
Eight In-tutorial assignments	10% (1.25% each)	Team*	Weekly except Sep. 8, Sep. 29, Oct. 27, Nov. 17 and Dec. 8	End of tutorial hour in which is assigned
Pre-project	5%	Team*	Week of Sep. 18	Week of Oct. 2
Quiz 1	10%	Individual	Oct. 27	
Project	15%	Team*	Week of Oct. 9	Week of Dec. 4
Assignment (peer-graded, 2 Parts)	5%	Team*	Week of Oct. 16	Week of Nov. 27
Quiz 2	10%	Individual	Nov. 17	
Lab	5%	Group**	Week of Nov. 20	Week of Nov. 27
Final Exam	40%	Individual	TBA (Dec. Examination Period)	

* Team is student-formed (same team throughout the entire course)
** Group is instructor-formed (applies just to the lab)

Course Policies:

The following course-specific policies will be enforced throughout the course:

Laboratory session

- All students are to attend the laboratory session to which they signed up.
- Failure to pass the laboratory component of the course will attract automatic course failure.
- Passing of the laboratory component is equivalent with obtaining more than 50% on the laboratory component of the course.
- A maximum of **one** make-up session will be offered to students who have missed a laboratory session **with** academic consideration.
- All approved make-up laboratory sessions will be offered in the final week of the term.
- Missing of a laboratory session **without** academic consideration will translate into a zero mark for that laboratory session.
- When academic consideration has been obtained for a particular laboratory session, it is student's responsibility to contact *timely* (*i.e.*, within maximum three days after consideration has been obtained from the Engineering Undergraduate Services Office) the instructor of the course to seek alternate arrangements for the missed laboratory session.
- Students are required to contact the instructor of the course for any other circumstances that appear to not be covered by the non-exhaustive list above.

Quizzes

- The quizzes will take place during the scheduled tutorial sessions.
- Quizzes will be closed book.

- Each quiz will be approximately 1.5 hours long with the reminder of tutorial time used to discuss the quiz solution.
- Missing a quiz **without** academic consideration will translate into a zero mark for that quiz.
- **No make-up quizzes will be offered** to students who have missed any of the scheduled quizzes **regardless of academic consideration**.
- The weighting of missed quizzes will automatically be shifted to the final exam.
- Academic consideration for quizzes (greater than or equal 10% weight) can be obtained from Engineering Undergraduate Services.
- Students are required to contact the instructor of the course for any other circumstances that appear to not be covered by the non-exhaustive list above.

Project & Pre-Project

- Project teams will be formed in the first week of classes via OWL sign-up.
- The maximum team size will be three students, while the minimum team size will be two students.
- Students who do not choose a team will be assigned to one.
- SolidWorks will be used for the kinematic analysis of the mechanism generated for project purposes.
- The default assumption is that everyone contributes equally to the team effort (*i.e.*, project and labs) and hence everyone should receive the same mark for the common team submission.
- Please note that whenever individual contributions to the team effort are not equitably shared by the team members, individual adjustments of the marks might occur at the discretion of the instructional team of the course (*i.e.*, course instructor and teaching assistants).
- Students are required to contact the instructor of the course for any other circumstances that appear to not be covered by the non-exhaustive list above.

In-Tutorial Assignments

- **In-tutorial assignments will take place during the second hour of the tutorials.**
- The assignments will consist of problems to be solved by the same team formed for project-solving purposes.
- The instructor of the course will solve problems during the first tutorial hour. Problems like them will constitute the subject of the in-tutorial assignment for the following week.
- Teams will receive problem solving assistance from TA and instructor who will be in the tutorial room. However, prior knowledge on problems assigned (like the ones solved by the instructor in the preceding week) will be highly beneficial.
- No make-up sessions will be offered for those missing the in-tutorial assignment (irrespective of the reason).
- If the in-tutorial assignment is missed **with** academic consideration, the weighting allotted to in-tutorial assignments will be calculated as the average of the remaining assignments.
- If the in-tutorial assignment is missed **without** academic consideration, then the mark for the missed assignment will be zero.
- Academic consideration for in-tutorial assignments (under 5% individual weight) can obtained from the MME Undergraduate Coordinator.

- The default assumption is that everyone contributes equally to the in-tutorial assignment team effort and hence everyone should receive the same mark for the common team submission.
- Please note that whenever individual contributions to the team effort are not equitably shared by the team members, individual adjustments of the marks might occur at the discretion of the instructional team of the course (*i.e.*, course instructor and teaching assistants).
- Students are required to contact the instructor of the course for any other circumstances that appear to not be covered by the non-exhaustive list above.

Peer-Graded Assignment

- The assignment will consist of two separate, but interconnected parts: Part 1 will require the team to work together and complete the required deliverable(s) whereas Part 2 will require each team member to review and grade/rank the deliverables submitted by all other teams in the class.
- Part 1 will be graded by the rest of the class ("peer-graded assignment").
- Part 2 will not receive any marks, but those who will not submit timely their ranking of Part 1 submissions will incur individual late penalties of 20% per day for the peer-graded assignment (even if Part 1 was submitted on time by the team).
- The default assumption is that everyone contributes equally to the project team effort and hence everyone should receive the same mark for the common team submission.
- Please note that whenever individual contributions to the team effort are not equitably shared by the team members, individual adjustments of the marks might occur at the discretion of the instructional team of the course (*i.e.*, course instructor and teaching assistants).
- Students are required to contact the instructor of the course for any other circumstances that appear to not be covered by the non-exhaustive list above.

Term work

- If a minimum of 60% is not obtained on term work (quizzes, pre-project, project, in-tutorial assignments, and laboratory sessions), the student will fail the course irrespective of the mark obtained in the final examination.
- Please note that whenever possible, due warning on this topic will be given. However, since the term project (15% weight) is due in the final day of classes, it is possible that accurate calculations will not be possible until final grades are calculated.
- No appeals on this topic will be accepted, such that students are strongly encouraged to self-monitor their academic progress in the course throughout the term

Final examination

- Only non-programmable calculators will be allowed during the final examination.
- If a minimum of 50% is not obtained on the final examination, the student cannot receive a final mark greater than 48%.

Submissions

- In-tutorial assignments are due at the end of the tutorial hour in which they were assigned. No late submissions will be accepted.
- Lab reports will be due at the end of the lab session in which data was provided and was processed. No late submissions will be accepted.

- Late submissions of the pre-project tutorials will be penalized with 20% per day.
- Late submissions of the project will be penalized with 20% per day.
- Students are required to contact the instructor of the course for any other circumstances that appear to not be covered by the non-exhaustive list above.

Units:

Metric and US Customary.

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.

Classroom Demeanor:

The instructor is committed to providing a respectful learning environment for all students involved in this course. This is a collective responsibility of the instructor and students, and therefore students partaking in this course agree to abide by this criterion. This includes arriving at lectures on time and acting in a professional manner during class.

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, and with the permission of the Dean, the student will be debarred from taking the regular final examination in the course.

Accommodation Policies:

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The accommodation policy can be found here: Academic Accommodation for Students with Disabilities.

Absence Due to Illness or Other Circumstances:

Students should immediately consult with the instructor or program Director if they have any problems that could affect their performance in the course. Where appropriate, the problems should be documented (see the attached "Instructions for Students Unable to Write Tests or Examinations or Submit Assignments as Scheduled"). The student should seek advice from the instructor or program Director regarding how best to deal with the problem. Failure to notify the instructor or program Director immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

For more information concerning medical accommodations, see the relevant section of the Academic Handbook:

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

For more information concerning accommodations for religious holidays, see the relevant section of the Academic Handbook:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar.

Cheating and Plagiarism:

Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. University policy states that cheating, including plagiarism, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning.

All required papers may be subject to submission for textual similarity review to commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents on the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between the University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, in the relevant section of the Academic Handbook:

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

Use of Electronic Devices:

You are permitted to use electronic devices including smartphones, tablets and laptops during class for course-related activities only. This includes but is not limited to: viewing lecture PowerPoints, viewing other course documents, accessing OWL, posting questions, collaborating in group activities, and running SolidWorks.

Policy on Repeating All Components of a Course:

Students who have failed an Engineering course (i.e. < 50%) 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 for grading by the student in subsequent years.

Internet and Electronic Mail:

Students are responsible for regularly checking their Western e-mail and the course web site (https://owl.uwo.ca/portal/) and making themselves aware of any information that is posted about the course. If the student fails to act on information that has been posted on these sites and does so without a legitimate explanation (i.e., those covered under the illness/compassionate form), then there are NO grounds for an appeal.

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 519-661-2111 ext. 82147 for any specific question regarding an accommodation.

Support Services:

Office of the Registrar, http://www.registrar.uwo.ca/

Student Development Centre, http://www.sdc.uwo.ca/

Engineering Undergraduate Services, http://www.eng.uwo.ca/undergraduate/

USC Student Support Services, http://westernusc.ca/services/

Students who are in emotional/mental distress should refer to Mental Health @ Western, http://www.health.uwo.ca/mental_health/, for a complete list of options about how to obtain help.

Western Engineering

Western University - Faculty of Engineering
2023-2024

STATEMENT ON GENDER-BASED AND SEXUAL VIOLENCE

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced gender-based or sexual violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts, here. To connect with a case manager or set up an appointment, please contact support@uwo.ca.

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.

A. *GENERAL REGULATIONS & PROCEDURES*

1. All first-year students will report to the Undergraduate Services Office by submitting the Academic Consideration Request Form, for all instances.

2. If you are an upper year student and you are missing a test/assignment/lab or examination you will report the absence by submitting Academic Consideration Request Form. Absences worth LESS THAN 10% of your mark, will be processed by your department office. If your course work is worth 10% OR MORE of your final grade, your request will be processed by the Undergraduate Services Office.

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/MIDTERM TESTS*

1. If you are in first year and you are unable to write a midterm/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 midterm/term test, inform your instructor PRIOR to the scheduled date of the test and request relief through the Academic Consideration Request Form. If the instructor is not available, leave a message for him/her at the department office. If the test is worth LESS THAN 10% of your mark, your request for relief will be processed by your department office. If the test is worth MORE THAN 10% of your final grade your request for relief will be processed by the

Undergraduate Services Office.

3. Be prepared to attach supporting documentation to the Department Chair and/or the Undergraduate Services Office through the online form (see next page for information on documentation).

4. Discuss with the instructor if and when the test can be rescheduled. The approval of the Chair or the Undergraduate Services Office is required when rescheduling midterm/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 report your absence using the Academic Consideration Request Form and 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, headache, 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 submit an "Application for a Special Exam" form. The Undergraduate Services Office will then notify the course instructor(s) and reschedule the examination on your behalf.

PLEASE NOTE: **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 submit the Academic Consideration Request Form and 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 Assistant Dean, First Year Studies, 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, Undergraduate Studies. 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, Undergraduate Studies.

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 are strongly encouraged to seek advice from your Academic Counsellor in the Undergraduate Services Office.

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 2023 Western Academic Calendar available at www.westerncalendar.uwo.ca.

Absences Due to Illness:
https://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_135

Academic Accommodations for Students with Disabilities:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_10

Academic Accommodations for Religious or Holy Days:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_16

Course Withdrawals:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=6&SelectedCalendar=Live&ArchiveID=#Page_75

Examinations:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?PolicyCategoryID=5&command=showCategory&SelectedCalendar=Live&ArchiveID=

Scheduling of Term Assignments:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#SubHeading_78

Scholastic Offences:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_20
Student Medical Certificate:
https://www.eng.uwo.ca/files/undergraduate/student-medical-certificate.pdf
Engineering Academic Regulations:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=4&SelectedCalendar=Live&ArchiveID=#Page_86

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.

Add Deadlines:

First term half course (i.e. "A" or "F")	September 15, 2023
Full courses and full-year half course (i.e. "E", "Y" or no suffix)	September 15, 2023
Second term half course (i.e. "B" or "G")	January 16, 2024

***Drop Deadlines*:**

First term half course without penalty (i.e. "A" or "F")	November 13, 2023
Full courses and full-year half courses without penalty (i.e. "E","Y" or no suffix)	November 30, 2023
Second term half or second term full course without penalty (i.e. "B" or "G")	March 7, 2024

Contact Information:

Undergraduate Services Office:	SEB 2097	Phone: 519-661-2130	E-mail: engugrad@uwo.ca
Chemical & Green Process Engineering:	TEB 477	Phone: 519-661-2131	E-mail: cbeugrad@uwo.ca
Civil Engineering:	SEB 3005	Phone: 519-661-2139	E-mail: civil@uwo.ca
Computer, Electrical, Mechatronic Systems & Software Engineering	TEB 279	Phone: 519-661-3758	E-mail: eceugrad@uwo.ca
Integrated Engineering	ACEB 2410	Phone: 519-661-6725	E-mail: engceli@uwo.ca
Mechanical Engineering:	SEB 3002	Phone: 519-661-4122	E-mail: mmeundergraduate@uwo.ca

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