

Western University <i>Department of Mechanical & Materials Engineering</i> MME 3380B – Mechanical Components Design COURSE OUTLINE – 2024-2025	
CALENDAR DESCRIPTION:	The objective of this course is to consider the mechanical analysis and design of various components of a machine, <i>e.g.</i> an automobile.
COURSE INFORMATION:	Instructor: James Johnson, Ph.D., P.Eng., FCAE Room: CMLP 1307 Tel: 519-661-2111 ext. 88255 Email: jajohnso@uwo.ca Lectures/tutorials/labs: See Draft My Schedule
CONSULTATION HOURS:	Office hours: W:11:30-12:30
PREREQUISITES:	MME 2202a/b and MME 3381a/b
ANTIREQUISITES:	None (or from academic calendar).
ACCREDITATION UNITS:	Engineering Science = 40% Engineering Design = 60%
TOPICS:	<ul style="list-style-type: none"> • Displacement and Stress Analysis of Mechanical Components • Static Failure Theory and Design • Fatigue Failure Theory and Design • Gearing Types and Load Analysis • Spur Gear Design • Shaft Design and Analysis • Bearing Selection and Analysis • Bolt Selection and Analysis • Welding Processes, Weld types and Analysis • Fits and Geometric Dimensioning and Tolerancing (GD&T)
LEARNING OUTCOMES:	<p>The Mechanical and Materials Engineering Program has been accredited by Canadian Engineering Accreditation Board (CEAB) of Engineers Canada. Accredited programs provide the academic requirements for licensure as a professional engineer in Canada. Western Engineering has defined indicators of the 12 Graduate Attributes (GAs) that the CEAB expects graduating engineering students to demonstrate. The connections between course learning outcomes and Western Engineering's GA Indicators are identified below.</p> <p>Upon successful completion of this course, students will be able to:</p> <ol style="list-style-type: none"> 1. analysis of a mechanical component for strength, stiffness, & durability. (KB2,KB3, PA1, PA2) 2. specification of suitable dimensions and materials to achieve a desired factor of safety or design goal. (KB3, PA2) 3. understanding of potential failure processes such as fracture, fatigue and wear. (KB3)

	<p>4. design and selection of typical components of mechanical systems.(D1,D2,KB3, PA1)</p> <p>5. preparation of a project report including detailed design approaches and team management/resources. (CS3,D4, KB4, EPM2)</p>																						
CONTACT HOURS:	Three (3) class sessions, Two (2) laboratory hours twice in the term.																						
TEXTBOOK:	<p><i>Shigley’s Mechanical Engineering Design</i> by Budynas and Nisbett, McGraw-Hill, 12th ed.</p> <p>(Cost = ~\$160, Students are welcome to purchase second-hand or earlier editions of this textbook.)</p>																						
UNITS:	SI will be used; however, English units will be employed occasionally in examples and homework problems.																						
EVALUATION:	<p>The final grade is computed as follows:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">Labs:</td> <td style="text-align: right;">8%</td> </tr> <tr> <td colspan="2">2 labs of equal weighting are due at end of each lab.</td> </tr> <tr> <td>Design Project (group):</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Phase 1 Report</td> <td style="text-align: right;">7%</td> </tr> <tr> <td style="padding-left: 20px;">Phase 2 Report</td> <td style="text-align: right;">15%</td> </tr> <tr> <td>Midterm:</td> <td style="text-align: right;">20%</td> </tr> <tr> <td colspan="2">(Designated Assessment- cannot use as an undocumented absence)</td> </tr> <tr> <td>Final Exam:</td> <td style="text-align: right;">50%</td> </tr> <tr> <td colspan="2">To be scheduled during the final exam period.</td> </tr> <tr> <td colspan="2">WEC Bonus Mark</td> </tr> <tr> <td colspan="2">1% for competing, additional 1% for placing in top 3 at WEC (2024-25)</td> </tr> </table> <p>Students are required to submit all laboratory reports, design reports, and write the examinations.</p> <p>*Note: see course-specific policies below which outline circumstances when alternative grading weighting for the midterm and final may apply.</p>	Labs:	8%	2 labs of equal weighting are due at end of each lab.		Design Project (group):		Phase 1 Report	7%	Phase 2 Report	15%	Midterm:	20%	(Designated Assessment- cannot use as an undocumented absence)		Final Exam:	50%	To be scheduled during the final exam period.		WEC Bonus Mark		1% for competing, additional 1% for placing in top 3 at WEC (2024-25)	
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COURSE POLICIES:	<p>The following course-specific policies will be strictly enforced throughout the course:</p> <p>Laboratory sessions</p> <ul style="list-style-type: none"> • 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. 																						

	<ul style="list-style-type: none"> • Missing of a laboratory session without academic consideration will translate into a mark of zero for that laboratory session. • When academic consideration has been obtained for a particular laboratory session, it is the student's responsibility to contact the instructor of the course in a <i>timely</i> fashion in order to seek alternate arrangements for the missed laboratory session (<i>i.e.</i>, within maximum three days after consideration has been obtained from the Engineering Undergraduate Services Office). • 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. <p>Midterm</p> <ul style="list-style-type: none"> • The midterm will take place as indicated under Evaluation above. • The midterm will be 1.5 h long. • Missing the midterm without academic consideration will translate into a mark of zero. • Should a student miss the midterm with academic consideration, there will be no make-up midterm, however the value of the midterm will be shifted to the final exam. • If cheating during the examination is suspected, the Associate Chair Undergrad will investigate and will determine an appropriate resolution. This may range from completing a one-on-one oral examination with the instructor, to receiving a grade of zero on the exam, to further academic penalties for scholastic offences applied by the Associate Dean Undergrad. • 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. <p>Project</p> <ul style="list-style-type: none"> • Project teams will be formed in the fourth week of classes via online sign-up. • The maximum team size will be four students, while the minimum team size will be three students. • It is expected that the team will self-delegate for the various aspects of the project. Hence, wide-ranging expertise including CAD, component analyses, assembly and report-generation is expected. • Students who do not choose a team will be assigned to one. • SolidWorks will be used for the design drawings and layouts. • The default assumption is that everyone contributes equally to the team effort (<i>i.e.</i>, 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>i.e.</i>, course instructor and teaching assistants). <p>Term work</p> <ul style="list-style-type: none"> • If a minimum of 50% is not obtained on term work (midterm, Phase I & II of the project, and laboratory sessions), the student will fail the course irrespective of the mark obtained in the final examination. <p>Final examination</p> <ul style="list-style-type: none"> • The exam will take place during the Spring examination period. The timing will be announced in advance. • The length of the final exam will be three hours.
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	<ul style="list-style-type: none">• If a minimum of 50% is not obtained on the final examination, the student cannot receive a final mark greater than 48%.• If cheating during the examination is suspected, the Associate Chair Undergrad will investigate and will determine an appropriate resolution. This may range from completing a one-on-one oral examination with the instructor, to receiving a grade of zero on the exam, to further academic penalties for scholastic offences applied by the Associate Dean Undergrad.• 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. <p>Submissions</p> <ul style="list-style-type: none">• 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 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.
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General Faculty / University Policies

In the event of contradictions between course-specific policies above and general Faculty / University policies described below, please contact your course instructor for clarification.

Missed/Late Accommodation Policy

1. Students missing a test/assignment/lab or examination you will report the absence by submitting an Academic Consideration Request form through [STUDENT ABSENCE PORTAL](#).
2. **Documentation must be provided as soon as possible.**

Exam Accommodation

1. If you are unable to write a final examination, report your absence using the Academic Consideration Request Form through [STUDENT ABSENCE PORTAL](#).
2. Be prepared to provide the Undergraduate Services Office with supporting documentation (below 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 Academic Consideration Request Form through [STUDENT ABSENCE PORTAL](#).

PLEASE NOTE: It is the student's responsibility to check the date, time and location of the Special Examination.

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 below 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. Some courses may have built-in flexibility for assignment deadlines or the total number of assignments that will be graded. See course-specific policies for details.
5. 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.

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

Medical Accommodation

1. The Academic Consideration Request Form is available through the [STUDENT ABSENCE PORTAL](#).
2. Requests for academic consideration must include the following components:
 - a. Indication of the course(s) and assessment(s) affected by the request
 - b. Medical note, and
 - c. Additional supporting documentation as relevant
3. Requests for academic consideration without a medical note or other supporting documentation may be accepted once per term, per course.

4. Undocumented absences cannot be used for examinations scheduled by the Office of the Registrar during official examination periods (including take-home final exams and December mid-year exams for full courses) and practical laboratory and performance tests typically scheduled in the last week of the term. Undocumented absences also cannot be used for the “designated assessment” in each course. When flexibility in assessment exists and is clearly stated on the course outline, both undocumented absences and academic consideration requests with documentation may be denied.
- 5. Students must request academic consideration as soon as possible and no later than 48 hours after the missed assessment.**
6. Once the request and supporting documents have been received and reviewed, appropriate academic consideration, if granted, shall be determined by the instructor in consultation with the academic advisor, in a manner consistent with the course outline.

Academic consideration may include extension of deadlines, waiver of attendance requirements for classes/labs/tutorials, or re-weighting of course requirements. Some forms of academic consideration, such as arranging Special Examinations, assigning a grade of Incomplete, or granting late withdrawals without academic penalty, may only be granted by the Academic Advising office of the Faculty of Registration.
7. An instructor may deny academic consideration for any assessment that is not required in the calculation of the final grade (e.g., “8 of 10 quizzes”). Assessment flexibility must be indicated on the course outline.
8. An instructor may deny academic consideration relating to the timeframe submission of work where there is already flexibility in the submission timeframe (e.g., 72-hour submission window). This assessment flexibility must be indicated on the course outline.

**Religious
Accommodation**

When scheduling unavoidably conflicts with religious holidays, which (a) require an absence from the University or (b) prohibit or require certain activities (i.e., activities that would make it impossible for the student to satisfy the academic requirements scheduled on the day(s) involved), no student will be penalized for absence because of religious reasons, and alternative means will be sought for satisfying the academic requirements involved. If a suitable arrangement cannot be worked out between the student and instructor involved, they should consult the appropriate Department Chair and, if necessary, the student's Dean.

It is the responsibility of such students to inform themselves concerning the work done in classes from which they are absent and to take appropriate action.

**Academic
Integrity**

In the Faculty of Engineering, we encourage students to create a culture of honesty, trust, fairness, respect, responsibility, and courage, befitting the professional degree you are pursuing.

Please visit [Academic Integrity Western Engineering](#) for more information

**Academic
Offences**

Plagiarism means using another's work without giving credit. The university has rules against plagiarism and other scholastic offences. Western Engineering has a zero-tolerance policy on plagiarism. The minimum penalty is zero on the course work and a repeat offence will earn you zero on the course. A third offence may lead to expulsion from the university.

[Scholastic Discipline for Undergraduate Students](#) & [Cheating, Plagiarism and Unauthorized Collaboration: What Students Need to Know](#)

Students must write their reports, 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

Faculty of Engineering AI Policy

The use of generative Artificial intelligence (GenAI) tools won't be discouraged in the Faculty of Engineering. As we pride ourselves on building the future we can't hide from the use of GenAI tools to contribute to the understanding of the course materials. However, the use of GenAI tools in any assignment or contribution during the course will have to be disclosed, as a resource.

GenAI tools use won't be permitted in any type of examination or other assessments where the faculty have prohibited their use. If use of GenAI tools is detected by the instructor in these instances, academic offences penalties might be imposed against the student.

Use of English Policy

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 except for 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.

Accessibility

Western is committed to achieving barrier free accessibility for persons with disabilities studying, visiting and working at Western. As part of this commitment, there are a variety of services, groups and committees on campus devoted to promoting accessibility and to ensuring that individuals have equitable access to services and facilities. To help provide the best experience to all members of the campus community, please visit the [Accessibility Western University](#) for information on accessibility-related resources available at Western.

Students with disabilities may arrange for academic accommodation at Western. For a more detailed explanation, please visit [Academic Support & Engagement -Academic Accommodation](#).

Inclusivity, Diversity, and Respect

The Faculty of Engineering at Western University is committed to creating equitable and inclusive learning environments that value diverse perspectives and experiences. We recognize that university courses often marginalize students based on social identity characteristics such as, but not limited to, Indigeneity, race, ethnicity, nationality, ability, gender identity, gender expression, sexuality, age, language, religion, and socioeconomic status. Understanding this, we strive to facilitate equitable experiences and inclusion within the classroom by respecting and integrating multiple ways of knowing, being, and doing. Please visit the [Office of Equity, Diversity and Inclusion](#).

Health and Well-Being

- [Health & Wellness Services – Students](#) - Offers appointment-based medical clinic for all registered part-time and full-time students.
- [Mental Health Support](#) - Provides professional and confidential services, free of charge, to students needing assistance to meet their personal, social and academic goals. Services include consultation, referral, groups and workshops, as well as brief, change-oriented psychotherapy.

- [Crisis Support](#) - For immediate assistance, please visit Thames Hall Room 2170 or call 519-661-3030. The crisis clinic operates between 11:00 am - 4:30 pm. For after-hours crisis support, click [here](#).
- [Gender-Based Violence and Survivor Support](#) - 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.

Important Links

- [WESTERN ACADEMIC CALENDAR](#)
- [ACADEMIC RIGHTS AND RESPONSIBILITIES](#)
- [ENGINEERING PROGRESSION REQUIREMENTS AND ACADEMIC REGULATIONS](#)
- [UNIVERSITY STUDENTS' COUNCIL \(USC\) - SERVICES](#)
- [IMPORTANT DATES AND DEADLINES](#)
- [ACADEMIC CONSIDERATION FOR MEDICAL ILLNESS - UNDERGRADUATE STUDENTS](#)
- [ACCOMMODATIONS FOR RELIGIOUS HOLIDAYS](#)
- [SCHEDULING OF ASSIGNMENTS, TESTS, AND EXAMINATIONS](#)
- [STUDENT FORMS](#)
- [OFFICE OF THE REGISTRAR](#)
- [RETENTION OF ELECTRONIC VERSION OF COURSE OUTLINES \(SYLLABI\)](#)
- [ACADEMIC APPEALS](#)
- [STUDENT ABSENCE PORTAL](#)

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 13, 2024
Full courses and full-year half course (i.e. "E", "Y" or no suffix)	September 13, 2024
Second term half course (i.e. "B" or "G")	January 14, 2025

Drop Deadlines:

First term half course without penalty (i.e. "A" or "F")	November 12, 2024
Full courses and full-year half courses without penalty (i.e. "E", "Y" or no suffix)	December 2, 2024
Second term half or second term full course without penalty (i.e. "B" or "G")	March 7, 2025

Contact Information:

Undergraduate Services Office:	SEB 2097
Phone: 519-661-2130	E-mail: engugrad@uwo.ca
Mechanical Engineering:	SEB 3002
Phone: 519-661-4122	E-mail: mmeundergraduate@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: ceugrad@uwo.ca
Integrated Engineering	ACEB 2410
Phone: 519-661-6725	E-mail: engceli@uwo.ca
Office of the Registrar/Student Central	WSSB 1120
Phone: 519-661-2100	