

MME 3380B – Mechanical Components Design

COURSE OUTLINE – 2025-2026

CALENDAR DESCRIPTION: The objective of this course is to consider the mechanical analysis and design of various components of a machine, *e.g.* 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 2200s, MME 2202a/b and MME 3381a/b

ANTIREQUISITES: MSE 3380a/b.

ACCREDITATION UNITS: Engineering Science = 40% Engineering Design = 60%

TOPICS:

- 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:

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.

Upon successful completion of this course, students will be able to:

1. Analyze mechanical components for strength, stiffness, & durability. (KB2,KB3, PA1, PA2, ET1)
2. specify suitable dimensions and materials to achieve a desired factor of safety or design goal. (KB3, PA2, ET1)
3. understand potential failure processes such as fracture, fatigue and wear. (KB3)
4. design and select typical components of mechanical systems. (D1,D2,KB3, PA1)
5. prepare project reports including detailed design approaches & drawings, and understand management/resources. (CS3,D4, KB4, EPM2)

CONTACT HOURS: Three (3) class sessions per week, Two (2) laboratory hours twice in the term.

TEXTBOOK: *Shigley's Mechanical Engineering Design* by Budynas and Nisbett, McGraw-Hill, 12th ed. Available from publisher at <https://www.mheducation.com/>
(Students are welcome to purchase second-hand or earlier editions of this textbook.)

UNITS: SI will be used; however, English units will be employed occasionally in examples and homework problems.

EVALUATION: The final grade is computed as follows:

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 2025-2026 Bonus Marks:

1 mark for competing, additional 1 mark for placing in top 3

Students are required to submit all laboratory reports, design reports, and write the examinations.

*Note: see course-specific policies below which outline circumstances when alternative grading weighting for the midterm and final may apply.

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

Laboratory sessions

- 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 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 *timely* fashion in order to seek alternate arrangements for the missed laboratory session (*i.e.*, 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.

Midterm

- 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.

Project

- 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.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).

Term work

- 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.

Final examination

- 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.
- 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.

Submissions

- 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.

General Faculty / University Policies

The Faculty of Engineering and Western University have overarching policies that prescribe how undergraduate courses should run. The course-specific policies described above should be considered *in addition to* those overarching policies, or as course-specific interpretations of them. In the event of contradictions or confusion between course-specific policies above and general Faculty / University policies, please contact your course instructor for clarification.

Western Engineering's undergraduate policies can be found by navigating to:
<https://www.eng.uwo.ca/undergraduate/academic-support-and-accommodations/policies.html>

and then clicking the “Engineering Undergraduate Policies framework” link.