

SCHOOL OF BIOMEDICAL ENGINEERING

BME 3201 –FUNDAMENTALS OF BIOMEDICAL ENGINEERING DESIGN

Course Outline Fall 2025

OFFICE HOURS	Mondays 1:30-2:30pm
ANTIREQUISITE(s):	
PREREQUISITE(s):	<p>Students must have completed the entire first year program in Engineering, with no outstanding credits to be taken, and have a Year Weighted Average (YWA) of at least 80%, as well as permission from the School of Biomedical Engineering.</p> <p>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.</p>
CEAB Academic Units:	Engineering Science 20%, Engineering Design 80%
TEXT / Course Resources / References	<p>There is no required textbook for this course; however, the suggested text is as follows:</p> <p>P. King, R.C. Fries, A.T. Johnson, <i>Design of Biomedical Engineering Devices and Systems</i>, Third edition, Taylor and Francis Group, CRC Press, 2015.</p>
DESCRIPTION <p>Biomedical engineering is a broad field of study, which involves applying the concepts, knowledge, and approaches of engineering to solve health care related problems. The objective of this course is to develop design skills and tools used in biomedical</p>	

engineering design. An integration of the engineering and life sciences will be covered through the presentation of design principles for medical devices and systems.

General Learning Objectives (CEAB Graduate Attributes)

Knowledge Base	D	Engineering Tools	D	Impact on Society	I
Problem Analysis	D	Individual & Teamwork	A	Ethics and Equity	I
Investigation	D	Communication	A	Economics and Project Mgmt.	
Design	A	Professionalism	A	Life-Long Learning	I

Rating: I – The instructor will introduce the topic at the level required. It is not necessary for the student to have seen the material before. D – There may be a reminder or review, but the student is expected to have seen and been tested on the material before taking the course. A – It is expected that the student can apply the knowledge without prompting (e. g. no review).

Learning Outcomes	(CEAB) Graduate Attribute
<p>General Learning Objective:</p> <p><i>At the end of this course, students will be expected to apply the biomedical engineering design process to solve a specific clinically driven problem.</i></p> <p>Topics and Specific Learning Objectives</p> <p>1. Biomedical requirements and specifications</p> <p>At the end of this section, students will be able to:</p> <ol style="list-style-type: none"> Define design requirements by assessing the needs of clinical partners. Create specifications based on customer needs and prioritize design features. Investigate the state of the art and critically analyze existing solutions. <p>2. Biomedical design concepts</p> <p>At the end of this section, students will be able to:</p> <ol style="list-style-type: none"> Consolidate specifications and perform a brainstorming session to ideate possible solutions. Create and sketch design solutions and investigate their advantages and disadvantages in a biomedical application. <p>3. Evaluation of biomedical designs</p> <p>At the end of this section, students will be able to:</p> <ol style="list-style-type: none"> Perform a complete design of the device, system, or process and evaluate it via simulation and prototyping. 	

4. Assessment and approval of biomedical products

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

- a. Design an experiment to evaluate the performance of a biomedical product.
- a. Describe the steps needed to implement the product as a real solution in the BME field (e.g., ethics approval, Health Canada approval).

Assessment

Course Component	Composition	Due Date	Weight
Class Attendance	Weekly Lecture Reflection	Due at 11:59pm the day of each class.	10%
Assignments	Need Recognition Case Study	September 29	30%
	Patient Journey Map	October 6	
	Brainstorming	October 16	
	The Interview	November 10	
	Concept Building and Screening	November 10	
	Design Brief	October 29	
Design Project	Design Report: Step 1	September 29	60%
	Design Report: Step 2	October 14	
	Design Report: Step 3	November 10	
	Design Report: Step 4	November 20	
	Final Poster Presentation	December 3	
	Final Design Project Write Up	December 5	

EXTRA COURSE INFORMATION

I. Class Attendance

Students are expected to attend all class sessions and actively participate for the duration of the class. Each week students will be asked to write a reflection based on that weeks lecture and this will count for a 10% of the final grade, for up to 12 weeks of attendance. This means that students may miss a lesson without the need to explicitly request accommodation.

II. **Missed/Late Accommodation Policy**

1. Students missing a test/assignment/lab or examination you will report the absence by submitting Academic Consideration Request form through [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. 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.

III. **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 is not required if assignments will be completed prior to the last day of classes.
4. This course employs flexible deadlines for assignments. The assignment deadlines can be found above in the course outline. For each assignment, students are expected to submit the assignment by the deadline listed. Should illness or extenuating circumstances arise, students are permitted to submit their assignment up to 72 hours past the deadline without academic penalty. As flexible deadlines are used in this course, requests for academic consideration will not be granted. If you have a long-term academic consideration or an accommodation for

disability that allows greater flexibility than provided here, please reach out to your instructor at least one week prior to the posted deadline.

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).

IV. **Medical Accommodation**

1. Requests for Academic Consideration Request Form through [STUDENT ABSENCE PORTAL](#).
2. Requests for academic consideration must include the following components:
 - a. Self-attestation signed by the student (*This is only accepted for the first/one absence*)
 - b. Medical note
 - c. Indication of the course(s) and assessment(s) affected by the request
 - d. Supporting documentation as relevant
1. Requests without supporting documentation are limited to one per term per course.
2. **Students must request academic consideration as soon as possible and no later than 48 hours after the missed assessment.**
3. 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.

4. 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.
5. 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.

V. **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.

VI. **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](#)

VII. **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

VIII. **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.

IX. **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.

X. **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](#).

XI. **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](#).

XII. **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 Contacts

Engineering Undergraduate Services	SEB 2097	519-661-2130	engugrad@uwo.ca
Biomedical Engineering	ACEB 2405	519-661-4288	bmeoffice@uwo.ca
Office of the Registrar/Student Central	WSSB 1120	519-661-2100	

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](#)