

Course Details

Course Title & Number:	BIOE 4610 Design of Assistive Technology Devices
Class Times & Days of Week:	Lectures: MWF 11:30-12:20 Labs: Th 2:30-5:15
Location for classes/labs/tutorials:	Remote learning via UM Zoom (until end of February)
Pre-Requisites:	BIOL 1412 Human Physiology

Note: The course will be offered by remote learning until public health conditions allow for in-person activities to resume on campus. As of the start of the term, the plan is for the course to transition to in-person learning during the week of February 28 after the Winter Term Break.

Course Description:

Application and design of technology for individuals with disabilities; emphasizing the development of the requisite knowledge, skills, and attitudes to evaluate, design, and implement client-centred assistive technology. A multi-disciplinary approach will be emphasized with instructors from both the Department of Biosystems Engineering and the Department of Occupational Therapy participating in delivery of the course. Students will complete a design project.

Instructor Information

Instructor(s) Name:	Dr. Danny Mann, P.Eng.
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Instructor(s) Name:	Dr. Jacquie Ripat
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Teaching Assistant	Ms. Robyn Birch
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Textbook, Readings, Materials

Required:

Cook, A.M. and J.M. Polgar. 2015. Assistive technologies: Principles and Practices, Fourth Edition. St. Louis, MI: Elsevier Mosby. (ISBN: 978-0-323-09631-7)

General Course Information

This course is modeled on the interdisciplinary approach used by practicing occupational therapists and rehabilitation engineers to identify suitable technological aids for an individual with a disability. Drawing on experiential learning theory and an interprofessional learning approach, engineering students in this unique course will learn how to perform a clinical assessment of a client with a disability. Participation in a clinical assessment gives the assessor an understanding of the unique abilities of the client, the environment in which the client lives and works, and the interaction between the client and the environment.

How does this course fit into the curriculum?

This course is one of the design electives available for students in the Biosystems Engineering program. It is a required course for students choosing to complete the Biomedical Specialization. Design electives are typically taken by Biosystems Engineering students in either the third or fourth year of the program.

Course Goals

The intent of this course is:

- To introduce students to the field of rehabilitation engineering, specifically the provision of assistive technology devices for individuals with disabilities.
- To provide students with a real-life design opportunity.
- To introduce students to the process of clinical assessment as a tool that can be used in the analysis of a design problem involving client-centred assistive technology.
- To introduce students to the tools used in outcome assessment.
- To provide students with an opportunity to collaborate equitably with group members in a team setting to manage an engineering design project.
- To provide students with opportunities to effectively communicate a design solution (written and oral).

Intended Learning Outcomes

At the conclusion of the course, the student should be able to:

1. Explain the basic categories of assistive technology and the basic characteristics of each category of assistive technology.
2. Analyze a case scenario to select an appropriate category of assistive technology device.
3. Use tools of clinical assessment and outcome assessment in a design scenario involving client-centred technology.
4. Design and evaluate an assistive technology device for a client with a disability.
5. Summarize the results of the design process in a formal report and oral presentation.

Expected Level of Development in Course **

Learning Outcome	Attribute*											
	KB	PA	IN	DE	ET	IT	CS	PR	IE	EE	EP	LL
1	I											
2		D										
3					A							
4				A								
5							A					

*Attributes:

KB A knowledge base for engineering
PA Problem analysis
IN Investigation
DE Design
ET Use of engineering tools
IT Individual and team work
CS Communication skills
PR Professionalism
IE Impact of engineering on society/ environment
EE Ethics and equity
EP Economics and project management
LL Life-long learning

*Expected Level of Development:

I – Introductory
D – Intermediate
A – Advanced

Course Evaluation Methods

Engineering Design Reports (3 @ 15%)	45%
Quizzes (3 @ 10%)	30%
Final Examination	25%

Engineering Design Reports: BIOE 4610 is being structured around the concept of project-based learning. Students will have opportunity to work on three projects. Teams will consist of approximately 5 students. Written reports and oral presentations will be required for all three projects. Details of each project will be provided at a later date. Students will be assigned a team grade on these engineering design reports.

Quizzes: Lecture content is being organized around the three design projects. There will be an in-class quiz on the Friday following the completion of each design project covering the lecture content relevant to each design project. Quizzes will be completed individually.

Final Examination: A 2-hour final examination will be scheduled during the examination period.

Graduate Attributes

All courses in the Biosystems Engineering program are expected to contribute, in some way, to the development of one or more of the 12 graduate attributes that have been identified by the Canadian Engineering Accreditation Board. The table below shows the graduate attributes covered in BIOE 4610 in relation to the assessment element that contributes to your overall grade in the course. The final column indicates the approximate level of development in graduate attributes that is anticipated in this course.

Assessment	Value	Attributes Covered	Indicators being assessed	Level*
Engineering Design Reports	45%	Design Engineering tools Communication Skills	DE.2 Uses design process DE.3 Develops design solution DE.4 Devises and implements a plan to evaluate a design solution ET.1 Uses tools to complete engineering activities CS.2 Produces appropriate engineering documents CS.3 Delivers effective technical presentations	A
Quizzes	30%	Knowledge Base	KB.4 Recalls and defines, and/or comprehends and applies, first principles and concepts in specialized engineering science	D
Final Examination	25%	Knowledge Base	KB.4 Recalls and defines, and/or comprehends and applies, first principles and concepts in specialized engineering science	D

*Level of Development of Graduate Attributes (I = Introductory; D = Intermediate; A = Advanced)

Grading

The grading scale used for this course is shown below.

Letter Grade	Percentage out of 100
A+	92-100
A	85-91
B+	78-84
B	72-77
C+	66-71
C	60-65
D	50-59
F	Less than 50

Assignment Extension and Late Submission Policy

Deadlines are a reality in the world of engineering; we expect assignments to be completed on time. Assignments submitted after the due date will be docked 10% per day.

Important Dates

February 22-25:	No classes – Winter term break
March 3:	Team presentations for Project #1
March 4:	Quiz #1
March 31:	Team presentations for Project #2
April 1:	Quiz #2
April 21:	Team presentations for Project #3
April 22:	Quiz #3
April 25:	Last date for Voluntary Withdrawal for Winter Term courses
April 25:	Last day of classes for Winter Term
April 26 – May 3:	Winter Term Final Exam period

UNIVERSITY & COURSE POLICIES

Using Copyrighted Material

Please respect copyright. We will use copyrighted content in this course. The content used is appropriately acknowledged and is copied in accordance with copyright laws and University guidelines. Copyrighted works, including those created by us, are made available for private study and research and must not be distributed in any format without permission.

Recording Class Lectures

Drs. Danny Mann and Jacquie Ripat, and the University of Manitoba hold copyright over the course materials, presentations and lectures that form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission from Dr. Danny Mann or Dr. Jacquie Ripat. Course materials (both paper and digital) are for the participant's private study and research.

Course Technology

Related to remote classes: We will be using the UM Zoom platform that is integrated with this course through UM Learn. Please ensure that you access the class invite that is available through the “Integrations” tab along the top menu when you log in to your UM Learn account. We recognize that some of you may experience bandwidth/internet issues that make it difficult to keep your camera on during lectures, but we would encourage you to leave your camera on during lectures if you are able. Please remember to remain muted except when you have been asked to speak to reduce background noise that interferes with our ability to communicate with the class. It is our intent to utilize breakout rooms to facilitate the team projects; it is likely ok to keep your mic turned on when in these breakout rooms with your team members. It is not our intention to record the lecture sessions, however, all PowerPoint files will be posted in UM Learn to facilitate studying.

Related to in-person classes: As a courtesy to both the instructors and your classmates, use of cell phones is not permitted during class time. Please remember to switch your cell phone to vibrate mode to avoid interruptions. Laptops may be used during lectures only for the purpose of taking notes. PowerPoint lectures will be posted in UM Learn.

Class Communication

The University requires all students to activate an official University email account. For full details of the Electronic Communication with Students please visit:

http://umanitoba.ca/admin/governance/media/Electronic_Communication_with_Students_Policy_-_2014_06_05.pdf

Please note that all communication between you as a student and your instructors/TAs must comply with the electronic communication with student policy:

(http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html). You are required to obtain and use your U of M email account for all communication between yourself and the university.

Academic Integrity

Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty. Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room. Exam cheating can also include exam impersonation. A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty. Students should acquaint themselves with the University's policy on plagiarism, cheating, exam impersonation and duplicate submission. Electronic detection tools may be used to screen assignments in cases of suspected plagiarism.

Expectations: You Can Expect Us To

Learning is most effective when both the teacher and the student are engaged in the subject material. The role of the teacher, therefore, is to create an environment that facilitates student engagement (and therefore learning). In this course, some dissemination of information will occur using the traditional lecture format. However, the course will also utilize other techniques such as classroom discussion of readings and case studies.

Expectations: We Expect You To

We expect you to be in attendance, and on time, for all scheduled lectures and labs. If you must be absent, please show us the courtesy of sending an e-mail notifying us of your absence. To benefit the most from this class, you must be willing to participate in class discussions. Therefore, you will be expected to prepare for class by reading the assigned materials.

Student Accessibility Services

Student Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services <http://umanitoba.ca/student/saa/accessibility/>

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