



Course Outline

Instructor

- Dr. Natasha Jacobson, P.Eng.
(she/her)
E1-358 EITC
(204) 474-7917
Natasha.Jacobson@umanitoba.ca

Student Hours

- Wednesdays 3:00 – 5:00 PM
- Individual assistance is always available by appointment - stop by!

Communications Support

- Dr. Jillian Seniuk-Cicek (she/her)
SP-333 EITC
(204) 474-9698
Jillian.SeniukCicek@umanitoba.ca

Industry Support

- Mr. Jamies White (he/him)
E1-268 EITC
James.White@umanitoba.ca

Teaching Assistant

- Bailey Paziuk
Bailey.Paziuk@umanitoba.ca

Location

- E2-350 EITC
Tues & Thurs 8:30 – 11:20 AM

Contact Hours

- 4 credit hours
- Lectures:
3 hours x 13 weeks = 39 hours
- Laboratories:
3 hours x 13 weeks = 39 hours

Prerequisites:

- BIOE 3900 Biosystems Design 2

Course Website:

<http://umanitoba.ca/umlearn>

Traditional Territories Acknowledgement

The University of Manitoba campuses are located on the original lands of the Anishinaabeg, Cree, Oji-Cree, Dakota, and Dene peoples, and on the homeland of the Métis Nation.

We respect the Treaties that were made on these territories, we acknowledge the harms and mistakes of the past, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.

BIOE 4900 Biosystems Engineering Design 3

Fall 2022

Course Description

An opportunity for the Biosystems Engineering student to practice fundamental engineering competencies (project management, technical communication) in the preparation of a preliminary design for the client. Students will be expected to demonstrate professionalism as a part of a design team.

Course Content

This course aims to satisfy a number of engineering and communication objectives. Through a problem-solving approach with an emphasis on clear communication, design teams will produce a set of deliverables for a prototype or proof of concept that will be manufactured in BIOE 4950 during the following winter term. These deliverables will include (1) design calculations, (2) drawings, (3) specifications, and (4) material costs/budgets.

It is also the effort of this course to provide students with the opportunity to converse in various engineering communication scenarios and demonstrate competency (1) maintenance of an engineering journal, (2) document revision, and (3) effective and engaging presentation skills.

The following topics will be covered:

- Design Process
- Decision-making/Critical Thinking
- Project Management
- Communication – written, oral, and graphical
- Professionalism

Textbook

Fundamental Competencies for the 21st-Century Engineer, Second Edition, Dunwoody, A.B., T.N. Teslenko, J. Reilly, S.E. Nesbit, P.J. Cramond and C.S. Paterson, 2018. Don Mills, ON: Oxford University Press. ISBN 0199026602 (Optional)

Engineering Design, Sixth Edition, Dieter, G.E., and Schmidt, L.C. 2021. New York, NY: McGraw Hill. ISBN 1260113299 (Optional)

Accreditation Details

- Mathematics: 0%
- Natural Science: 0%
- Complementary Studies: 25%
- Engineering Science: 0%
- Engineering Design: 75%

Graduate 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

Competency Levels

- 1 - Knowledge (Able to recall information)
- 2 - Comprehension (Ability to rephrase information)
- 3 - Application (Ability to apply knowledge in a new situation)
- 4 - Analysis (Able to break problem into its components and establish relationships.)
- 5 - Synthesis (Able to combine separate elements into a whole)
- 6 - Evaluation (Able to judge the worth of something)

Grading Scale

Note: These boundaries represent a guide for the instructor and class alike. Provided that no individual student is disadvantaged, the instructor may vary any of these boundaries to ensure consistency of grading from year-to-year.

Letter	Mark
A+	92–100
A	85–91
B+	78–84
B	72–77
C+	66–71
C	60–65
D	50–59
F	< 50

Learning Outcomes

By the end of the course, you will be able to:

No.	Learning Outcome	Transferable Skill
1	Use appropriate communication strategies to manage and document an engineering design project	Written and oral communication; project management
2	Propose a conceptual design to an external client with a technical report	Professionalism; technical communication; design
3	Use project management tools and fundamentals to manage an engineering design project	Project management; teamwork
4	Use appropriate information (i.e., research literature, engineering codes, standards, etc.) to generate and/or support design information	Research; analysis
5	Present and accept critique from a wider audience on how design components fit within the overall team design project	Professionalism; oral communication; teamwork

Expected Competency Levels

Outcome	KB	PA	IN	DE	ET	IT	CS	PR	IE	EE	EP	LL
1				5							3	
2				3					3			
3				3							3	
4											3	
5				6					4	3		

CEAB Graduate Attributes Assessed

- DE.1 – Understands the complexities of an open-ended engineering design problem and defines appropriate objectives and constraints
- DE.2 – Uses an appropriate design process that considers all relevant factors (i.e., health and safety risks; standards; economic, environmental, cultural and societal considerations)
- DE.3 – Develops possible solutions to an open-ended design problem, leading to an appropriate recommendation
- DE.4 – Devises and implements a plan to evaluate a proposed design solution
- IE.1 – Understands the social, environmental, economic, health, safety, legal and/or cultural aspects of engineering activities
- IE.2 – Predicts environmental and socio-economic impacts associated with engineering activities
- IE.3 – Develops solutions for adverse environmental and/or socio-economic impacts
- IE.4 – Understands and/or applies the concepts of environmental stewardship, sustainable design and development
- EE.3 – Demonstrates individual accountability
- EP.2 – Understands concepts of project management
- EP.3 – Critically applies management tools and economic principles in engineering projects

Important Dates

- **Early Withdrawal Deadline**
September 20, 2022
- **Memo 1 (Problem Definition)**
September 20, 2022
- **National Day for Truth and Reconciliation**
September 30, 2022
No classes or examinations
- **Thanksgiving**
October 10, 2022
No classes or examinations
- **Project Plan Revision 1**
October 20, 2022
- **Memo 2 (Concept Selection)**
October 25, 2022
- **Fall Term Break**
November 7-10, 2022
No classes or examinations
- **Remembrance Day**
November 11, 2022
No classes or examinations
- **Memo 3 (Concept Development)**
November 15, 2022
- **Voluntary Withdrawal Deadline**
November 22, 2022
- **Design Reviews**
November 29 & December 1, 2022
- **Project Plan Revision 2**
December 8, 2022
- **Peer Evaluations**
December 9, 2022
- **Safety Training and Orientation**
January 11 & 13, 2023
- **Last Day of Classes**
December 12, 2022

Evaluation

Shop Safety Training and Orientation is required to move to BIOE 4950.

Component	Value (%)	Assessor	Method of Feedback*	Learning Outcomes Evaluated	I/T**
Project Plan Revision 1	10	NJ & JSC	F, S	1, 3, 4, 5	T
Project Plan Revision 2	30	NJ & JW	F, S	1, 2, 3, 4, 5	T
Conceptual Design Presentation & Review	15	All ^A	F, S	2, 4, 5	T
Client Evaluation	5	Client ^B	S	2, 5	I/T
Memos (3)	15	NJ & JW	F, S	1, 4, 5	T
Professionalism ^C	15	NJ	S	2, 5	I
Engineering Logbook	10	NJ	F, S	1, 4	I

* Method of Feedback: F - Formative (written comments and/or oral discussion), S - summative (numerical grade)

** I/T: I – Individual effort, T – Team effort

^A Conceptual Design Presentation & Review Assessment: Grade based on feedback from instruction team, client, as well as feedback from guest experts including department technicians and internal faculty.

^B Client: “Client” refers to a representative external to the instruction team responsible for supervising team projects given personal expertise in the area. May include industry representatives or faculty.

^C Professionalism: Grade based on attendance, self-evaluations, peer evaluations, and client evaluations. It is at the instructors’ discretion to use the peer/client evaluations to inform the professionalism grade. Students with poor peer/client evaluations may lose their Professionalism mark and could be assessed up to a 10% deduction to the Team deliverables.

Academic Integrity

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the *General Academic Regulations on Academic Integrity*, students are reminded that plagiarism or any other form of cheating in examinations, term tests, assignments, projects, or laboratory reports is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating by another student is also subject to serious academic penalty.

Copyright Notice

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 Copyright Office

Requirements/Regulations

- All email communication must conform to the Communicating with Students university policy.

[*Communicating with Students*](#)

- As the Instruction Team, we will do our best to respond to all emails within 48 hours during working hours (8:30 AM – 5:00 PM Monday thru Friday). Ex. A Friday night email may not be responded to until the following Tuesday.
- Late assignments will be deducted at a rate of 10% per day past the outset deadline.
- Self-declaration forms may be completed for missed tests, exams, or assignments during short-term absences (≤ 72 hours) for extenuating circumstances. This form cannot be used for planned absences like vacations. It is also not to be used for longer-term absences, or ongoing circumstances (e.g., Authorized Withdrawals, Leaves of Absence, or other accommodations), which will still require additional documentation.

[*Self-Declaration Form for Brief or Temporary Absence*](#)

[*Self-Declaration Policy for Brief or Temporary Absence*](#)

- **All assignments must be submitted, and all workshops and seminars attended to pass the course.**
- Report review and feedback are available with Dr. Jillian Seniuk-Cicek. Review procedure:
 - Send an email with a PDF draft copy and explicitly state what you hope to gain from the review (ex. improved context, overall flow, clarity of solution, etc.).
 - Set a meeting time with Dr. Seniuk-Cicek to review feedback.
 - Submissions must be received a **minimum of 1 week (7 days)** before the assignment deadline for which meetings are held on a first-come, first-served basis.
- Students are expected to follow the CSBE reference style when citing references in course assignments. The *Biosystems Engineering Citation Guide – CSBE Style* is available through UMLearn. Please refer to this guide to ensure that you follow the correct referencing style.
- It is the responsibility of each student to contact the instructor in a timely manner if they are uncertain about their standing in the course and about their potential for receiving a failing grade. Students should familiarize themselves with the University's *General Academic Regulations*, as well as Section 3 of the Faculty of Engineering *Academic Regulations* dealing with incomplete term work, deferred examinations, attendance, and withdrawal.

[*General Academic Regulations*](#)

[*Engineering Academic Regulations*](#)

- Students should be aware that they have access to an extensive range of resources and support organizations. These include Academic Resources, Counselling, Advocacy and Accessibility Offices as well as documentation of key University policies e.g. Academic Integrity, Respectful Behaviour, Examinations and related matters.

[*Supplemental Resources*](#)

- The Department of Biosystems Engineering has devised a plan so that there is minimal impact on the delivery and content of the course, should the instructor fall sick and is unable to continue lectures in-person. Please be assured that the alternative plan outlining any deviation from the normal mode of instruction will be communicated to you as quickly as possible if/when the need arises.

Retention of Student Work

Students are advised that copies of their work submitted in completing course requirements (i.e. assignments, laboratory reports, project reports, test papers, examination papers, etc.) may be retained by the instructor and/or the department for the purpose of student assessment and grading, and to support the ongoing accreditation of each Engineering program. This material shall be handled in accordance with the University's *Intellectual Property Policy* and the protection of privacy provisions of *The Freedom of Information and Protection of Privacy Act (Manitoba)*. Students who do not wish to have their work retained must inform the Head of Department, in writing, at their earliest opportunity.