

Course Outline

Instructor

- Dr. Warren Blunt, P.Eng. (he/him)
E1-310 EITC
(204) 474-7144
Warren.Blunt@umanitoba.ca

Office Hours

- Individual assistance is always available by appointment - please send an email.

Communications Support

- Ms. Aidan Topping (she/her)
SP-332 EITC
(204) 474-8329
Aidan.Topping@umanitoba.ca

Industry Support

- Mr. James White (he/him)
James.White@umanitoba.ca
- Ms. Anette Kroeker (she/her)
Anette.Kroeker@umanitoba.ca

Location

- **Human Ecology 300**
Mon 1:30 – 2:20 PM
Wed 1:30 – 4:20 PM
Fri 1:30 – 4:20 PM

Contact Hours

- 4 credit hours
- Lectures:
3 hours x 12.3 weeks = 37 hours
- Laboratories:
4 hours x 12 weeks = 48 hours

Prerequisites:

- BIOE 4900 Biosystems Design 3

Course Website:

<http://umanitoba.ca/umlearn>

BIOE 4950 Biosystems Engineering Design 4

Winter 2026

Course Objectives

The intent of this course is to allow students to complete the design project initiated in BIOE 4900. Design teams will be required to evaluate their design using an appropriate strategy prior to making a final recommendation to their industry client in the form of both a written project report and a formal presentation.

Course Content

The following topics will be covered:

- Design Process
- Prototype Design
- Design Evaluation
- Project Management
- Communication
- Professionalism and Ethics

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)

Learning Outcomes

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

No.	Learning Outcome	Transferable Skill
1	Use project management tools and fundamentals to manage an engineering design project.	Project management; teamwork
2	Evaluate an engineering design using an appropriate strategy (i.e., prototype, proof-of-concept model, computer simulation, mathematical model).	Analysis; prototyping; design
3	Write an engineering project report for an external client.	Written communication; professionalism
4	Disseminate technical information in a formal presentation	Oral communication; professionalism
5	Exhibit lifelong learning (reflect on engineering practice lessons).	Professionalism; lifelong learning

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

I - Introduced
 D – Intermediate (Developing)
 A - Advanced

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.
 Strong: A/A+; Competent: B/B+;
 Developing: C/C+; Needs Work: D/F

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

CEAB Graduate Attributes Assessed

This course will assess the following CEAB graduate attribute indicators:

Indicator (Level)	Indicator Description	Assessment Point
DE.4 (A)	Devises and implements a plan to evaluate a proposed design solution	Final Report: Evaluation Chapter
IT.2 (A)	Exhibits appropriate interpersonal skills when interacting with team members, including giving and receiving constructive feedback.	Peer Review 1
CS.2 (A)	Designs, produces, and delivers effective technical presentations for specific audiences.	Final Presentation
PR.1 (A)	Understands the role of the engineering profession in society and the responsibility of the Professional Engineer in protection of the public	Client Eval 2
IE.2 (A)	Analyzes engineering activities and/or develops solutions, taking into account past, present, and potential future environmental and socio-cultural aspects	Final Report: Recommendations
IE.3 (A)	Understands and/or applies the concepts of environmental stewardship, and sustainable design and sustainable development	Final Report: Sustainability Chapter
EE.3 (A)	Articulates one's own role in promoting ethics and equity	Reflection Q. 3
LL.2 (A)	Critically reflects on successes, challenges and mistakes to guide ongoing learning	Reflection Q. 2

Evaluation

Component	Value (%)	Assessor	Method of Feedback*	Learning Outcomes Evaluated	I/T**
Design Project Report	35	All	F, S	1, 2, 3	T
Design Poster & Presentation ^A	20	All ^A	F, S	1, 2, 4	T
Client Evaluation ^B	5	Client ^B	S	2, 3, 4	I/T
Memos (2)	10	JW, AK	F, S	1, 2	I
Professionalism ^C	20	WB	F, S	5	I
Reflection	10	WB	F	5	I

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

** I/T: I – Individual effort (40%), T – Team effort (60%)

^A Design Poster & Presentation 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 peer evaluations (5%), draft report level of completion (5%), in-class peer reviews (5%), and engagement at guest lectures (5%). Students with poor peer/client evaluations may lose their Professionalism mark and could be assessed up to a 10% deduction to the Team deliverables.

Important Dates

- **Memos due weekly starting:**
January 14, 2026
- **Early Withdrawal Deadline**
January 19, 2026
- **Peer-Review Session 1; Client Evaluation 1**
February 11, 2026
- **Peer-Evaluation 1; Client**
February 13, 2026
- **Louis Riel Day**
February 16, 2026
No classes or examinations
- **Winter Term Break**
February 17-20, 2026
No classes or examinations
- **Peer-Review Session 2;**
March 11, 2026
- **Voluntary Withdrawal Deadline**
March 19, 2026
- **Design Project Report**
March 23, 2026
- **Design Day**
April 2, 2026 12:30 – 5:30 PM
– Attendance required
- **Self-Reflection; Peer-Evaluation 2**
April 8, 2026 10:59 PM
- **Last Day of Classes**
April 9, 2026

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

All materials provided in this course are copyright and are provided under the fair dealing provision of the Canadian Copyright Act. This material may not be redistributed in any manner without the express written permission of the relevant copyright holder.

 Copyright Office

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.

Traditional Territories Acknowledgement

The University of Manitoba campuses and research spaces are located on original lands of Anishinaabeg, Ininiwak, Anisininewuk, Dakota Oyate, Dene and Inuit, and on the National Homeland of the Red River Métis.

UM recognizes that the Treaties signed on these lands are a lifelong, enduring relationship, and we are dedicated to upholding their spirit and intent. We acknowledge the harms and mistakes of the past and the present. With this understanding, we commit to supporting Indigenous excellence through active Reconciliation, meaningful change, and the creation of an environment where everyone can thrive. Our collaboration with Indigenous communities is grounded in respect and reciprocity and this guides how we move forward as an institution.

Updated: December 23, 2025

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 – 4:30 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 Ms. Aidan Topping on a first-come, first-served basis. Reviews cover communicative elements (not technical) and require a meeting with at least one team member to discuss the feedback. Review procedure:
 - Send an email with a PDF draft copy and explicitly state what you hope to gain from the review (e.g. improved context, overall flow, clarity of solution, etc.).
 - Set a meeting time with Ms. Aidan Topping to review feedback.
 - Submissions must be received a **minimum of 1 week** (7 days) before the assignment deadline.
- 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.