Course Outline

Instructor

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

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
- Dr. Don Petkau (he/him)
  Don.Petkau@umanitoba.ca

Student Hours

- Wed 1:00 PM – 2:00 PM (WB)
- Wed 2:00 PM – 3:00 PM (AT)
- Individual assistance is always available by appointment - please send an email.

Location

- **300 Human Ecology**
  Tues & Thurs 8:30 – 11:15 AM

Contact Hours

- 4 credit hours
- Lectures:
  3 hours x 12 weeks = 36 hours
- Laboratories:
  3 hours x 12 weeks = 36 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 Anishinaabeg, Ininiwak, Anisininewuk, Dakota Oyate and Dene and Inuit, and on the National Homeland of the Red River Métis.

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

F. 2025

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) technical specifications, (4) verification procedures, and (5) 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 in technical documentation and effective and engaging presentation skills.

The following topics will be covered:

- Design Process
- Project Management
- Communication – written, oral, and visual
- Professionalism

Textbooks (Optional)

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

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

Learning Outcomes

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

No.	Learning Outcome	Transferable Skill
1	Use appropriate communication strategies to document an engineering design project.	Written and oral communication
2	Establish technical specifications and corresponding verification procedures to define and evaluate an external client's design problem.	Professionalism; design
3	Report on a conceptual design to an external client.	Professionalism; technical communication; design
4	Use project management tools and fundamentals to manage an engineering design project.	Project management; teamwork
5	Use appropriate information (i.e., research literature, engineering codes, standards, etc.) to generate and/or support design information.	Research; analysis
6	Present and accept critique from a wider audience on how design components fit within the overall team design project.	Professionalism; oral communication; teamwork
7	Demonstrate concepts of professionalism and accountability as they relate to the profession of Engineering.	Professionalism; teamwork; engineering ethics

CEAB Graduate Attributes Assessed

This course will assess the following CEAB graduate attribute indicators:

Indicator (Level)	Indicator Description	Assessment Point
IN.4 (A)	Understands appropriate safe work procedures during experiments or laboratory exercise	Safety Training and Orientation
DE.1 (A)	Understands the complexities of an open-ended engineering design problem and defines appropriate objectives and constraints.	Project Definition Report
ET.2 (A)	Evaluates and selects or creates appropriate tools for a given scenario.	Conceptual Design Report: Evaluation Chapter
IT.1 (A)	Participates equitably in group activities and decision-making in leadership and followership (support) roles	Team Charter
CS.1 (A)	Designs and produces effective written and graphical engineering documents for specific audiences (e.g., research reports, engineering reports, design documents)	Memo 2
IE.3 (D)	Understands and/or applies the concepts of environmental stewardship, and sustainable design and sustainable development	Conceptual Design Report: Sustainability Chapter
EE.3 (D)	Articulates one's own role in promoting ethics and equity	Reflection Q. 3
EP.2 (A)	Understands and applies business practices including project, risk and change management.	Project Definition Report: Workplan
LL.1 (A)	Recognizes limitations of their knowledge and engages in actions to address them.	Reflection Q. 1, 2

Important Dates

- **Team Charter**
  September 9, 2025
- **Early Withdrawal Deadline**
  September 16, 2025
- **Memos due Tuesdays weekly starting:**
  September 16, 2025
- **National Day for Truth and Reconciliation**
  September 30, 2025
  No classes or examinations
- **Thanksgiving**
  October 13, 2025
  No classes or examinations
- **Safety Training and Orientation**
  October 14 & 16, 2025
- **Project Definition Report**
  October 16, 2025
- **Fall Term Break**
  November 10-14, 2025
  No classes or examinations
- **Remembrance Day**
  November 11, 2025
  No classes or examinations
- **Voluntary Withdrawal Deadline**
  November 18, 2025
- **Design Reviews**
  November 25 & 27, 2025
- **Conceptual Design Report**
  December 4, 2025
- **Last Day of Classes**
  December 8, 2025

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 Definition Report	10	All	F, S	1, 2, 4, 5	T
Conceptual Design Report	25	All	F, S	1, 2, 3, 4, 5	T
Conceptual Design Presentation	15	WB, AT	F, S	6, 7	T
Client Evaluation	5	Client[A]	S	2, 3, 7	I/T
Memos (2)	15	JW, DP	F, S	1, 4, 5	I
Professionalism[B]	15	All	S	3, 6, 7	I
Reflection	10	WB	F, S	1, 7	I
Team Charter	5	WB	F	1, 7	T

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

** I/T: **I** – Individual effort (45% of grade), **T** – Team effort (55% of grade)

[A] Client: "Client" refers to a representative external to the instruction team responsible for supervising team projects given personal expertise. May include industry representatives or faculty.

[B] Professionalism: Grade based on advisor meeting engagement (5%), draft report level of completion (5%) and in-class peer reviews (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.

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

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.
- Assignment deadlines have a one-hour grace period, after which the **assignment grade 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. 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 Ms. Aidan Topping 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 IEEE reference style when citing references in course assignments.
- 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

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.