

# Jniversity | Price Faculty of Engineering

**BIOE 4240 Graduation Project** 

Department of Biosystems Engineering

#### Course Outline

Instruction Team • Ms. Ella Morris, EIT

E1-330 EITC

E1-354 EITC

Student Hours

• E2 – 360 EITC

Contact Hours

3 credit hours

Prerequisites:

Course Website:

• BIOE 3270

• Lectures:

Location

(204) 474-7429

(204) 474-7919

Ella.Morris@umanitoba.ca

• Dr. David Levin, PhD (he/him)

David.Levin@umanitoba.ca

 Ms. Morris: Please e-mail to schedule appointment.

T 2:30-5:15 PM (as req'd)

3 hours x 12.3 weeks = 37 hours

Winter 2025

#### **Course Objectives**

There are many instances when an engineer will be faced with a situation when an informed decision cannot be made until sufficient information is provided. In such situations, there is a need to obtain information through means such as experimental study or a comprehensive review of the published literature. A practicing engineer will use these skills to maintain professional competence and to contribute to the advancement of the engineering knowledge. During this course, students will gain the experience of managing and completing an independent project. Communication skills will be developed through a preparation of a written project report and a formal presentation of project findings.

#### Course Content

This course aims to give students an opportunity to be solely responsible for completion of a term-long engineering project. This course will introduce students to the types of research relevant to the disciplines of Biosystems Engineering. By providing students with the opportunity to independently manage their project, students will develop the confidence to undertake lifelong learning activities intended to generate the information needed to make informed decisions.

The following topics will be covered:

- Course Introduction
- Forms of scientific misconduct, plagiarism
- · Scientific writing organization, abstracting, referencing style, introduction, objectives
- · Literature review, Materials & Methods, and How to make sense of your results
- How to effectively display your results, graphs and tables
- How to write effective conclusions
- Updates on progress of the projects. Input from the students.
- Making an effective oral presentation
- Individual updates on progress of the projects
- Updates on individual projects. Input from the students.

#### Textbook

None. Students are expected to follow the Canadian Biosystems Engineering journal referencing style when citing references in course assignments. The Instructions for preparing a paper for Canadian Biosystems Engineering is available through UM Learn. Please refer to this guide to ensure that you follow the correct referencing style.

#### **Course Delivery**

Lectures will proceed as listed in the left and this time will be used to deliver course content and presentations.

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 be 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.

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 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.

### Accreditation Details

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

#### 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.

| Letter | Mark   |  |
|--------|--------|--|
| A+     | 95-100 |  |
| А      | 86-94  |  |
| B+     | 80-85  |  |
| В      | 73-79  |  |
| C+     | 65-72  |  |
| С      | 60-64  |  |
| D      | 50-59  |  |
| F      | F < 50 |  |

#### Learning Outcomes

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

| No. | Learning Outcome   | Transferable Skill  |
|-----|--|---|
| 1   | critically evaluate scientific publications using a formant of an annotated bibliography | Lifelong Learning   |
| 2   | propose and execute a plan to investigate an engineering problem                         | Use of engineering tools,<br>ethics and equity, lifelong<br>learning, Individual work |
| 3   | compile a written report and compose an oral presentation.                               | Investigation,<br>communication skills  |

#### CEAB Graduate Attributes Assessed

This course will assess the following CEAB graduate attribute indicators shown below:

| Indicator<br>(Level) | Indicator Description   | Assessment Points                                    |
|----------------------|---|--|
| IN.1 (A)             | Gathers information (literature review,   | Annotated  |
|                      | measurements, experiments, laboratory   | Bibliography &                                       |
|                      | exercises) and analyzes data)   | Written Report                                       |
| IN.2 (I)             | Devises and/or implements an appropriate plan /<br>methodology for gathering information required<br>to solve a complex engineering problem                               | Thesis Proposal                                      |
| IN.3 (A)             | Interprets results and reaches appropriate conclusions  | Written Report                                       |
| CS.1 (A)             | Designs and produces effective written and<br>graphical engineering documents for specific<br>audiences (e.g., research reports, engineering<br>reports design documents) | Draft and Written<br>Report                          |
| CS.2 (A)             | Designs, produces, and delivers effective<br>technical presentations for specific audiences   | 3MT presentation &<br>Written Report                 |
| LL.3 (A)             | Demonstrates research and information literacy skills   | Annotated<br>Bibliography, Draft &<br>Written Report |

#### Assignments

The marks and grade for this course are based on six (6) Assignments: Assignment 1) The Research Proposal (5 points); Assignment 2) an Annotated Bibliography (5 points); Assignment 3) 3-Minute Thesis (3MT) presentation (5 points); Assignment 4) a project update and draft of Introduction and Methods (5 points); Assignment 5) The final written Thesis Report (50 points); and Assignment 6) an oral presentation of your Thesis Report (20 points). Your Thesis Supervisor will also provide an evaluation of your research activities (10 points). An exit survey must be completed at the end of the term to pass the course.

## Important Dates

Evaluation

- Early Withdrawal Deadline Jan. 17, 2025
- Research Proposal due Jan. 30, 2025
- Louis Riel Day Mon. Feb. 17, 2025 No classes or examinations
- Winter Term Break Feb. 18-21, 2025 No classes or examinations
- Annotated Bibliography due Feb. 27, 2025
- **3MT Presentation due** March 11, 2025
- Intro/Methods draft due March 20, 2025
- Voluntary Withdrawal Deadline March 19, 2025
- Oral Presentation & Written Report Due April 8, 2025
- Last Day of Classes Wed. April 9, 2025
- Exit Survey due April 10, 2025
- •

| Component   | Value<br>(%) | Assessor      | Method of<br>Feedback* | Learning<br>Outcomes<br>Evaluated |
|---|--------------|---------------|------------------------|-----------------------------------|
| Research Proposal:<br>Due Jan. 30                       | 5            | EM            | S                      | 2                                 |
| Annotated<br>Bibliography: Due<br>Feb. 27               | 5            | EM            | F, S                   | 1, 2, 3,                          |
| 3MT Presentation:<br>March 11                           | 5            | EM            | F, S                   | 2, 3                              |
| Project Update,<br>Intro/Methods Draft:<br>Due March 20 | 5            | EM            | F, S                   | 2, 3                              |
| Oral Presentation:<br>April 8                           | 20           | Dept.         | F, S                   | 3                                 |
| Written Report: Due<br>April 8                          | 50           | DL, EM,<br>PI | F, S                   | 3                                 |
| Advisor Review  | 10           | PI            | S                      | 3                                 |

\* Method of Feedback:  $\mathbf{F}$  - Formative (written comments and/or oral discussion),  $\mathbf{S}$  - Summative (numerical grade); \*\* I/T:  $\mathbf{I}$  - Individual effort,  $\mathbf{T}$  - Team effort.

EM

F, S

N/A

#### Academic Integrity

(Mandatory)

Exit Survey: Due

April 10

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, such as use of Artificial Intelligence (AI) 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.

#### **Requirements/Regulations**

- No programmable devices or systems (such as calculators, PDAs, iPods, iPads, cell phones, smart watches, wireless communication, or data storage devices) are allowed in examinations unless approved by the course instructor.
- All email communication must conform to the Communicating with Students university policy.

Communicating with Students

- Attending lectures and laboratories is essential for the successful completion of this course.
- Self-declaration forms may be completed for missed tests, exams, or assignments during short-term absences (≤72 hours) for extenuating circumstances. Students don't need to share personal information about their situation beyond declaring the nature of the extenuating circumstance on the self-declaration form.

Self-Declaration Form for Brief or Temporary Absence

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• 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 Policy for Brief or Temporary Absences

• It is the responsibility of each student to contact the instructor in a timely manner if he or she is uncertain about his or her standing in the course and about his or her 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.

Seneral Academic Regulations

Ø 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.

#### **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.

Or Copyright Office

#### Deferred Final Examinations

Students who miss the regularly scheduled writing of a final examination for valid medical or compassionate reasons will only be allowed to write a deferred exam if the Associate Dean (Undergraduate) approves the request. All requests for a deferred examination *must* be made within 48 hours of the missed exam and follow the procedure described on the Faculty website without exception. Course Instructors *do not have the discretion* to grant deferred final examinations.

Deferred Exam Policy (student experience website)