



## **Course Details**

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<b>Course Title &amp; Number:</b>	BIOE 7270 Advanced Seminar in Biosystems Engineering
<b>Number of Credit Hours:</b>	3
<b>Class Times &amp; Days of Week:</b>	Tuesdays 8:30 - 11:15 am
<b>Location for classes/labs:</b>	EITC E2 223
<b>Pre-Requisites:</b>	Registered in the Biosystems Engineering PhD Program

### **Course Description:**

A series of seminars to be given by Ph.D. candidates on research topics of current interest in Biosystems Engineering.

## **General Course Information**

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### **Who should take this course?**

This is a required course for Ph.D. students in Biosystems Engineering.

### **Why is this course useful?**

Biosystems engineering is a broad discipline that spans many research areas. Although the individual student cannot be expected to become an expert in all sub-disciplines within Biosystems Engineering, it is important that an individual graduating from this department be aware of the breadth of sub-disciplines that comprise the discipline of Biosystems Engineering. The course will also introduce doctoral students to post-PhD life in the Canadian context, with an emphasis on grantsmanship and the review/evaluation of technical papers.

## **Course Objectives**

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To give Ph.D. students:

1. Exposure to the breadth of research topics within the discipline of Biosystems Engineering.
2. Insights into post-PhD life in the Canadian context.
3. Experience in grantsmanship and the review/evaluation of research proposals.
4. Experience in the review/evaluation of technical papers.

## **Textbook, Readings, Materials**

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Course materials will be posted on the UM Learn Portal.

## Class Schedule

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**Sep 9:** Course overview; orientation to Department of Biosystems Engineering. Discussion of Literature Survey assignment.

**Sep 16:** Grantsmanship: Writing for the purpose of securing research funding (differences between basic & applied research, differences between a research project & a research program); EDI in research. Discussion of Research Proposal assignment.

**Sep 23:** **Students will present the results of the Literature Survey assignment.**

**Sep 30:** **Orange Shirt Day (no class)**

**Oct 7:** Understanding the role of peer review in the scientific process; strategies for reviewing a manuscript. Discussion of Manuscript Review assignment.

**Oct 14:** The importance of technical societies for lifelong learning and professional development.

**Oct 21:** Preparing for a career in academia I

**Oct 28:** Strategies for evaluation of research proposals.

**Nov 4:** Preparing for a career in academia II

**Nov 18:** Preparing for a career outside of academia I

**Nov 25:** Preparing for a career outside of academia II

**Dec 2:** **Students will make an oral presentation describing the content of their research proposal.**

## Course Evaluation Methods

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Students will be expected to complete the following term assignments.

Assignment	Allocation	Description	Due Date
Literature Survey	15%	Biosystems engineering is a broad discipline that spans many research areas. Although the individual student cannot be expected to become an expert in all sub-disciplines within Biosystems Engineering, it is important that an individual graduating from this department be aware of the breadth of sub-disciplines that comprise it. The course instructor will assign you to a sub-discipline that differs from your area of expertise (thesis area). i) Find 5 papers related to the assigned sub-discipline that have been published in refereed scientific journals in the past 3 years	Sep 23

		<p>and prepare a written document in the format of an annotated bibliography.</p> <p>ii) Prepare an oral presentation in which you introduce this sub-discipline to your colleagues by providing an overview of the research described in the 5 papers.</p>	
Literature Survey Reflection	5%	<p>Students are required to write a 1-2 paragraph reflection for each literature survey presentation given by members of the class. Students are asked to describe what they learned about each sub-discipline within the broad discipline of Biosystems Engineering.</p>	Sep 30
Manuscript Review	15%	<p>Those who have earned a doctorate are often called upon to review technical papers written by others. This is a critical step in the scientific process as peer review of scientific work is needed to ensure credibility of the published work. In the academic environment, it is also necessary to evaluate student work. For this assignment, students will be required to review two manuscripts written by undergraduate Biosystems Engineering students in course BIOE 4240 Graduation Project. The course instructor will provide a “reviewer response form”.</p>	Oct 14
Research Proposal Draft #1	40%	<p>Many individuals who successfully complete a doctoral program will find themselves in careers where it is essential to write funding proposals to secure research money (referred to as grantsmanship). Students are required to identify a research topic of interest and prepare a research proposal using a format provided by the course instructor. For the purposes of this assignment, any research topic is acceptable (including the area of engineering education). The intent of the assignment is to give students the opportunity to write a funding proposal in response to the guidelines and instructions imposed by the funding agency. The course instructor will explain the instructions and provide a template for the research proposal. Students may discuss the research topic with their academic advisor, but the research proposal should be written without editorial input from the academic advisor.</p>	Nov 4
Critique of Research Proposal	10%	<p>A task that is often assigned to those holding a doctoral degree is the evaluation of research proposals written by others. Critique of research proposals written by others is a necessary step in the academic process – it is how decisions are made regarding funding of research. Sometimes we are asked to review proposals that perfectly align with our own expertise. More often, however, we are asked to review proposals that do not perfectly align with our expertise. For this assignment, students will be given the task of evaluating the research proposal draft written by one of their peers. Evaluation criteria will be provided by the course instructor. The feedback will be shared with the author of the research proposal. Students will be graded on the thoroughness of the critique and the quality of the feedback provided to the author.</p>	Nov 11
Research Proposal Draft #2	10%	<p>Using the feedback provided, students will have opportunity to revise their research proposal. In addition to submitting the revised research proposal, students will be required to prepare a one-page written explanation of how the proposal was improved by the feedback received.</p>	Nov 25
Research Proposal Presentation	5%	<p>Students will give a 15 min presentation describing the content of their research proposal.</p>	Dec 2

## **Grading**

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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

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