

BIOE 2600 Principles of Plant and Animal Physiology for Engineers
Faculty of Agricultural & Food Sciences
Winter 2021 Course Syllabus
CRN 53374

Lectures: Mondays, Wednesdays & Fridays, 11:30 am to 12:20 pm; Remote Learning via WebEx

Labs: Laboratory sessions with associated assignments will be pre-recorded and uploaded on to the BIOE 2600 website on UM Learn. Each student is responsible for accessing the lab videos at the course website, and must submit the lab reports and assignments on time.

Textbooks (recommended):

Reece, JB, *et al.* 2014. Campbell Biology, 1st or 2nd Canadian Edition, Pearson

*Taiz, L, Zeiger E. 2010. Plant Physiology, 5th and 6th editions, Sutherland, Massachusetts, Sinauer Associates Inc. ISBN 978-0-87893-866-7

*The Taiz & Zeigler is available as an eBook rental on-line. You can access the information to rent this book at the website indicated below:

<http://www.coursesmart.com/plant-physiology-fifth-edition/lincoln-taiz-and-eduardo-zeiger/dp/9780878938667>

New for the Fifth Edition, Plant Physiology is available as an eBook via CourseSmart, at a substantial discount off the price of the printed textbook. The CourseSmart eBook reproduces the look of the printed book exactly, and includes convenient tools for searching the text, highlighting, and note-taking.

The Student Companion Website <www.plantphys.net> is free to access by anyone at any time. This website supplements the coverage provided in the textbook with additional and more advanced material on selected topics of interest and current research. The site includes the following:

- Web Topics: Additional coverage of selected topics across all chapters
- Web Essays: Articles on cutting-edge research, written by the researchers themselves
- Study Questions: A set of short answer-style questions for each chapter
- Suggested Readings: Chapter-specific recommended readings for further study or research

References to specific Web Topics and Essays are included throughout each textbook chapter, as well as at the end of each chapter.

Instructors: Dr. David B. Levin.
 Room E1-354 EITC
 Tel: 204-474-7429
 E-mail: david.levin@umanitoba.ca

Dr. Fuji Jian
 Room E1-532 EITC
 Tel: 204-474-7965
 E-mail: fuji.jian@umanitoba.ca

Office Hours: By appointment only. Please e-mail to request a meeting.

Evaluation:

Module 1 test: Plant Physiology: 40%
 Module 2 test: Animal Physiology: 40%
 Tutorial/Lab Assignments: 20% (6 assignments worth 3.33% each)
 Total: 100%

Lecture Schedule:

Plant Physiology Section: Monday, January 6th to Friday, February 14th, 2020

Animal Physiology Section: Monday, February 24th to Monday, April 6th, 2020

Module 1: Plant Physiology			Lecturer(s)
0	Jan 18	Introduction to the Course; Handout Syllabus	DBL & FJ
1	Jan 20	Plant Structure and Growth	DBL
2	Jan 22	Photosynthesis I	DBL
3	Jan 25	Photosynthesis II	DBL
4	Jan 27	Photosynthesis III	DBL
5	Jan 29	Plant Nutrition	DBL
6	Feb 01	Plant Responses	DBL
7	Feb 03	Plant water and cell relations I	FJ
8	Feb 05	Plant water and cell relations II	FJ
9	Feb 08	Plant water status	FJ
10	Feb 10	Transport in Plants I	FJ
11	Feb 12	Transport in Plants II	FJ
February 15th, Louis Riel Day: No Classes			
February 16th – 19th, Reading Week: No Classes			
12	Feb 22	Transport in Plants III	FJ
13	Feb 24	Light effects on Plants	FJ
14	Feb 26	Temperature effects in plants II	FJ
15	Mar 01	Temperature effects in plants III	FJ
16	Mar 03	Review Class	DBL & FJ
17	Mar 05	Module 1 Test	
Module 2: Animal Physiology			
18	Mar 08	Animal Form & Function	DBL

19	Mar 10	Animal Nutrition I	DBL
20	Mar 12	Animal Nutrition II	DBL
21	Mar 15	Homeostasis in Animals	FJ
22	Mar 17	Thermoregulation in Animals I	FJ
23	Mar 19	Thermoregulation in Animals II	FJ
24	Mar 22	Bioenergetics I: Energy Partitioning	FJ
25	Mar 24	Bioenergetics II: Heat Dissipation	FJ
26	Mar 26	Bioenergetics III: Metabolic Rate	FJ
27	Mar 29	Bioenergetics IV: LCT	FJ
28	Mar 31	Bioenergetics V: Metabolic Heat Production I	FJ
29	Apr 02	Good Friday: No Classes	
30	Apr 05	Circulation in Animals I	DBL
31	Apr 07	Circulation in Animals II	DBL
32	Apr 09	Gas Exchange in Animals	DBL
33	Apr 12	The Immune System I	DBL
34	Apr 14	The Immune System II	DBL
35	Apr 16	Review	DBL & FJ
		Module 2 Test To Be Scheduled in Exam Period	

Learning Outcomes

At the conclusion of this course, the student should be able to:

- 1) Explain basic principles of animal and plant physiological responses to the environment.
- 2) Explain interactions between engineering designs and animals and/or plants.
- 3) Use mathematical models to simulate plant and animal growth.

Course Policies:

Testing: Tests are as indicated in the schedule. If postponed, changes to the dates will be communicated to all students ahead of time. If tests are missed, students will be required to **submit appropriate documentation as to a compassionate or medical reason in order to write a deferred test**. The documentation **must be presented prior to writing a make-up test**. A medical emergency requires a written and signed note from a medical doctor. Schedule clashes require a letter from faculty in charge of the course or university-sanctioned activity. Students who miss a test without a valid excuse will receive a zero. In some areas, lectures will expand upon that found in the texts, and in others, texts will contain more detail than that covered in class. Testing will, however, be based on information presented in class whether verbal or written. If you miss lecture(s), it is your responsibility to obtain information on material covered and any announcements made during the lecture.

Statement on Academic Dishonesty:

University policy states that plagiarism or any form of cheating in examinations, term tests or academic work is subject to serious academic penalty. Penalties range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the faculty or university. Cheating in examinations or tests may take the form of copying from another student or discussing with other students. A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty.

Please see: http://www.umanitoba.ca/admin/governance/governing_documents/students/870.htm

BIOE 2600
Principles of Plant and Animal Physiology for Engineers
Graduate Attributes (GA)

BIOE 2600 - GA Summary

Graduate Attribute (*Data Points)	Weight	Level I/D/A
Knowledge Base*		I

I= Introductory; D = Intermediate; A=Advanced

BIOE 2600 - GA Expanded

Graduate Attributes *Data Points	Indicators	Descriptors	Level I/D/A	Assessments
Knowledge Base*	KB.3 Recalls and defines information, first principles and concepts in the natural sciences.	<ul style="list-style-type: none"> • Defines terminology and facts related to university level natural sciences • States first principles and theories in university level natural sciences 	I	Midterm & Final Exam
	KB.5 Recalls and defines information, first principles and concepts in fundamental engineering science.	<ul style="list-style-type: none"> • Defines terminology and facts related to engineering fundamentals • States first principles and theories in engineering fundamentals 	I	Midterm & Final Exam
	KB.6 Comprehends and applies information and concepts in fundamental engineering science.	<ul style="list-style-type: none"> • Shows an in-depth understanding of key ideas and concepts related to engineering science fundamentals • Applies theories to simple problems • Shows appropriate engineering interpretation of scientific terms • Uses fundamental engineering science to explain real world phenomena 	I	Assignments
	KB.2 Interpretation of Data: Ability to interpret mathematical and/or visual forms, including equations, diagrams, graphs, figures and tables.	<ul style="list-style-type: none"> • Demonstrates a skillful ability to provide rational explanations of the mathematical and/or visual information presented and can make appropriate inferences based on that information. 	D	Assignments, Midterm & Final Exam
	KB. 8 Calculations: Ability to carry out calculations and/or use mathematical software.	<ul style="list-style-type: none"> • Demonstrates skillful ability to carry out calculations. Calculations are relevant, correct and comprehensive, and are presented clearly and concisely. Mathematical software is skillfully used. 	D	Assignments, Midterm & Final Exam