

Department of Biology Course Outline

BIOL 3060 Animal Physiology I Fall 2017

Course Description

Fundamental concepts in animal physiology. Area that will stressed include biophysical, biochemical, cellular and anatomical mechanisms critical for animal function.

Three lecture hours per week. Eight laboratories each requiring 3 hours. One term test.

Prerequisites

SC/BIOL 2030 4.0; SC/BIOL 2020 4.0; SC/BIO 2021 4.0

(N.B. students lacking the prerequisites maybe allowed to take the course provided space exists.)

Course Instructors and Contact Information

Course Director: Peter Backx
Office: Room 133 Farquaharson
Phone: x33858
Email: pbackx@yorku.ca

Laboratory Co-ordinator and Director
Andrea Durant, adurant@yorku.ca

Schedule

Lectures:	Day:	Time:	Room:
	Monday	1:30-2:30PM	LSB103
	Wednesday	1:30-2:30PM	LSB103
	Friday	1:30-2:30PM	LSB103

Office hours: Monday, Wednesday, Friday 2:30-3:30PM.
by appointment only!

Laboratories:

Time: 3 hrs/week beginning the week of Sept 19. Days to be assigned.

Section# :	Day:	Time:	Room:
1	Tuesday	2:30-5:30PM	FRQ-206
2	Wednesday	2:30-5:30PM	FRQ-206
3	Thursday	2:30-5:30PM	FRQ-206
4	Monday	2:30-5:30PM	FRQ-206
5	Tuesday	2:30-5:30PM	FRQ-208
6	Wednesday	2:30-5:30PM	FRQ-208
7	Thursday	2:30-5:30PM	FRQ-208
8	Monday	2:30-5:30PM	FRQ-208

LABORATORY SCHEDULE

<u>Week of:</u>	<u>Lab #</u>	<u>Title</u>	<u>Written Report ?</u>
Sept. 19 - 23	1	Properties of Membranes	Required
Sept. 26 - 30	2	Introduction to Powerlab and Labchart	No
Oct. 3 - 7	3	Compound Action Potentials	Yes
Oct. 10 - 14	4	Sensory Nerve Action Potentials (M students do lab #4 on Oct 26 th)	Yes
Oct. 17 - 21	5	Skeletal Muscle	Yes
Oct. 24	(4)	Mon. students do lab #4 (no labs T,W,R)	Yes
Oct 31-Nov 4	6	Physiology of Frog Heart (Cardiac Muscle)	Yes
Nov 7 - 11	7	Vascular Smooth Muscle	Yes
Nov. 14 - 18	8	Sensory Physiology	Yes
Nov. 21 - 25	-	Lab exam review in lab period All lab reports to be returned	-
Nov. 28 – Dec. 2	-	LABORATORY EXAM , 15% final grade. Each section on its customary day of the week. Marks will be posted during the week of Dec 14 th .	

Written reports are required for FOUR laboratories. You are required to write a report on Lab #1, worth 2% of the final grade. This exercise will introduce you to detailed laboratory report writing and you will be given extensive feedback by your TA that should help you with the other laboratory reports. The three other reports are worth 6% each and you can choose ANY THREE exercises to write up from Lab #3 – Lab #8 (ie. any three of the six exercises marked “YES” above). TAs will set due dates and late penalties for report submissions. No reports will be accepted after December 7th (the last day to submit term work).

You are reminded that Senate Policy on Academic Dishonesty applies to all written work handed in. Copying or close paraphrasing from a lab partner, computer software, the internet or books are all considered **plagiarism**, and suspected cases will be reported. It is recommended that students set up an account at TurnItIn.com. Each submitted lab report should be accompanied by an originality report from TurnItIn, OR a complete collection of all the source material used in compiling your report (i.e., dated printouts of your literature/library searches, hand-written and typed drafts, and photocopies of references). Papers that do not include either the TurnItIn report or the required documentation will NOT be marked.

YOU ARE EXPECTED TO TAKE GOOD CARE OF THE APPARATUS YOU USE.

Evaluation

Midterm Test (Oct.21st 2016) = 20% (1 hour)
Laboratory work: Laboratory reports = 20%
Laboratory exam (Nov. 28th-Dec 2nd 2016) = 15%
Final examination
(during fall exam period) = 45%
Total = 100%

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“Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.”

Important Dates

Midterm Test (Oct.21st 2016) 1 hour
Laboratory exam (Nov. 28th-Dec 2nd 2016) 3 hours

Resources

Recommended (highly) Text: ‘Animal Physiology: From genes to organisms’ 2nd Edition (2012)
By Sherwood, Klandorf and Yancey, Publisher: Brooks/Cole Cengage Learning.
ISBN-978-0-8400-6865-1

Learning Outcomes

Upon successful completion of this course, students should be able to:
Understand the physiological principles underlying signaling in excitable cells such as nerve, muscle, sensory and endocrine tissues. Have a working understanding of the molecular and structural basis of electrical, contractile and sensory processes.

General topics to be discussed

Neuronal control of muscle contraction, electrical signaling in excitable cells such as nerves, skeletal muscle, heart and vascular smooth muscle. Sensing organs such as eye sight and hearing. Aspects of nerve function and integration will be discussed.

TENTATIVE LECTURE SCHEDULE

General Introduction to Physiology

General features of life system. Emphasis on diversity and adaptability using common physiological principles.

General Discussion of Excitable Cells

Communication in excitable tissues using neural control of contraction to illustrate. The general role of electrical signals across cell membranes for control of physiological events.

Molecular and biophysical basis of signaling and communication

Membrane structure and models
Mechanisms of exchange across membranes
Intercellular communication
Ion channels; types, structure
Action potentials in nerves, muscle and other excitable cells

The Nervous System, Ions and Excitation

Design of nervous systems; types of neurons
Origin and maintenance of the resting potential; cable properties
Electrotonic spread and regenerative propagation; non-spiking interneurons
Synaptic transmission - electrical and chemical
Neurotransmitters and neuromodulators

MID-TERM TEST FRIDAY OCTOBER 23rd, 2015

Mechanisms of Muscle Contraction

Molecular basis of contraction
Differences and similarities between skeletal muscle versus cardiac muscle versus vascular smooth muscle, including heart rate regulation

Cardiovascular System

Heart structure and function at the cellular and organ levels. Common definitions relevant to cardiac physiology. Concepts of electrical conduction, excitation-contraction, contractility. Pump function, Frank-Starling relationships, pressure-volume loops
Vascular structure-function (omitting details of capillaries which will be covered in Animal Physiology 2).

FINAL EXAMINATION: TO BE HELD IN EXAM PERIOD

Experiential Education and E-Learning

A good deal of information related to the topics discussed in class is available on the web. Students are encouraged to find course-related material on the web.

Other Information

Links for websites illustrating the concepts in class will often be provided in the lectures and in the notes.

Course Policies

For those missing the midterm (for appropriate reasons such as illness) students will have their final exam mark represent 65% of the final grade. Supplemental final exams will be provided for students missing the exam for appropriate and documented medical reasons.

Penalties for late lab assignments will be discussed in the laboratory section.

Lectures may be recorded.

University Policies

Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - <http://www.yorku.ca/academicintegrity/>

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Student's in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - <http://cds.info.yorku.ca/>

Counselling & Disability Services at Glendon - <http://www.glendon.yorku.ca/counselling/personal.html>

York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

Ethics Review Process

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the

community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at

http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf (PDF)

Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/>