

Department of Biology Course Outline

SC/BIOL 3070 4.00 Animal Physiology II  
Winter 2015

Course Description

The processes of digestion, osmoregulation and excretion, circulatory systems and gaseous exchange, metabolism, growth and reproduction are considered. The course adopts a comparative approach, first analyzing the basic principles underlying physiological activities, then examining the means whereby different organisms perform them. Three lecture hours, three laboratory hours. One term. Four credits.

Prerequisites

SC/BIOL 2030 4.00, SC/BIOL 2020 3.00, SC/BIOL 2021 3.00.

Course Instructors and Contact Information

Jean-Paul Paluzzi, PhD  
(416) 736-2100 ext 20999  
Department of Biology  
Lumbers Building, Rm. 221/221A (lab/office)  
Email: [paluzzi@yorku.ca](mailto:paluzzi@yorku.ca)  
Website: [www.yorku.ca/paluzzi](http://www.yorku.ca/paluzzi)

**Office hours: Monday 2:30-3:30pm (or by appointment)**

Schedule

**Lectures:** Monday, Wednesday and Friday 1:30-2:20pm – Life Sciences Building, Rm. 106

**Laboratories:** Monday, Tuesday, Wednesday or Thursday 2:30-5:30pm – Farquharson, Rm.206 or 208

Evaluation

<u>Grading:</u>	Midterm Test <sup>1</sup>	= 20%
	Laboratory reports <sup>2</sup> (3 @ variable weight)	= 21%
	Laboratory quizzes (8 x 0.5% each)	= 4%
	Laboratory exam <sup>1</sup>	= 15%
	Final Examination <sup>1</sup>	= <u>40%</u>

<sup>1</sup>**NOTE:** Multiple choice and short/long answer essay style question format that may include some choice and will be based exclusively on lecture content (or lab content for lab exam). Final exam will be cumulative, i.e. test all lecture material since the start of the course).

<sup>2</sup>**NOTE:** Reports are required for **three (3)** laboratories – the first, second and third lab reports will be worth 5, 7 and 9%, respectively. Students are encouraged to discuss and request the lab report

expectations with their designated TA for your lab section. Your TA will inform you whether or not a lab report is required at the end of each lab session. You will write a short quiz at the beginning of each lab that covers the material in the lab manual for that week. Attendance in each and every lab is **mandatory!** You **must** attend the laboratory in order to submit a report. If you miss a lab due to serious illness or serious emergency, you must make contact (e.g. email) with the course director, your TA, and the TA coordinator within 24hrs of your absence and provide valid documentation in hard copy (ie. Attending Physician's Statement).

### Important Dates

**Midterm test: February 12<sup>th</sup>, 2016**

**Lab exam: March 23<sup>rd</sup>, 2016**

NOTE: for additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website at <http://www.yorku.ca/yorkweb/cs.htm>

### Resources

**Textbook:** Sherwood L, Klandorf H, and Yancey P. 2012.  
**(highly recommended)** Animal Physiology: From Genes to Organisms. 2<sup>nd</sup> Edition, Cengage Learning. (Available at the York University Bookstore)

**Lab manual:** All lab files and manuals are posted on the Moodle coursepage and it is essential that students read all information as it contains detailed guidelines on the laboratory component (protocols, expectations, etc.).

**Other reference books that are on reserve in Steacie Library include:**

- I. Christopher Moyes, Patricia Schulte – Principles of animal physiology, 2nd Edition, 2008, Pearson Books.
- II. David Randall, Warren Burggren and Kathleen French – Eckert Animal physiology: Mechanisms and Adaptations, 5th Edition, 2002, W. H. Freeman and Company.
- III. Lauralee Sherwood, Robert Kell, Christopher Ward – Human physiology: from cells to systems, 2th Edition, 2013, Nelson Education.

### Learning Outcomes

Upon successful completion of this course, students should be able to:  
This course employs a comparative approach to studying various physiological processes in animals. Specifically, the physiology of digestion, osmoregulation, excretion, circulation, gaseous exchange, metabolism, reproduction and growth will be covered in this course. First, the basic principles underlying the above-mentioned physiological activities will be explained and then the means by which different organisms perform them will be examined. The laboratory component will provide an opportunity for students to conduct representative experiments from most of the organ systems covered in the lecture. Upon completion, students are expected to have a solid understanding of how selected physiological processes take place in animals, and to have practiced their scientific writing through data collection, analysis, presentation and interpretation of laboratory results.

### Course Content

## **TENTATIVE LECTURE SCHEDULE:**

### **Introduction** (Jan. 4<sup>th</sup>)

### **Blood and Circulatory System** (Jan. 6th, 8th, 11th, 13th & 15<sup>th</sup>)

- Anatomy of the circulatory system
- Blood cells
- Heart
- Hemodynamics and peripheral circulation
- Regulation of circulation

### **Gas exchange** (Jan. 18th, 20th, 22nd & 25<sup>th</sup>)

- Gas properties
- Transport of O<sub>2</sub> and CO<sub>2</sub> in the blood
- Gas exchange in air and in water

### **Iono- and Osmoregulation** (Jan. 27th & 29th, Feb. 1st & 3<sup>rd</sup>)

- Body fluid composition and exchange of ions and water
- Osmoregulation in aquatic environments
- Osmoregulation in terrestrial environments
- Excretion

### **Acid/Base Balance** (Feb. 5th & 8<sup>th</sup>)

- CO<sub>2</sub> transport and acid/base balance
- Ventilation and acid/base balance
- Excretion and acid/base balance

### **Extra lecture (if needed) and Midterm Exam Review** (Feb. 10<sup>th</sup>)

### **Midterm test** (Feb. 12<sup>th</sup>)

### **Reading Week – No Lectures/Labs** (Feb. 15th to 19<sup>th</sup>)

### **Feeding, Digestion and Absorption** (Feb. 22nd, 24th, 26th, 29th & Mar. 2<sup>nd</sup>)

- Food and feeding
- Alimentary system, gut motility and GI secretion
- Digestion, absorption and excretion

### **Metabolism** (Mar. 4th, 7th & 9<sup>th</sup>)

- Metabolic pathways
- Metabolic rate
- Regulation of metabolism

### **Thermoregulation** (Mar. 11th & 14<sup>th</sup>)

- Heat and body temperature
- Thermal regulation in ectotherms
- Thermal regulation in endotherms

### **Reproduction** (Mar. 16th, 18th, & 21<sup>st</sup>)

- Reproductive strategies
- Sexual determination, differentiation and maturation
- Male reproductive physiology
- Female reproductive physiology
- Fertilization, pregnancy and lactation

### **Growth** (Mar. 28th & 30th)

- Body growth (including long bone growth)
- Regulation of postnatal growth

### **Extra lecture (if needed) and Review for Final Exam** (Apr. 1st & 4<sup>th</sup>)

### Experiential Education and E-Learning

Relevant supplementary e-learning materials will be linked through lectures posted on Moodle and will include animations and other e-resources available with the official course textbook.

### Other Information

**Lab coats** are recommended for this course and may be purchased at the York University Bookstore.

**Safety glasses** (also available at the Bookstore) **MUST** be worn when handling hazardous chemicals, biological materials when aerosols are being created, and when using the centrifuge, compressed gases or vacuum equipment. Regular prescription glasses are **NOT** acceptable as they lack protective side shields and many styles do not sufficiently cover the eyes. Safety glasses can be worn over prescription glasses as can safety goggles (available at hardware stores, e.g. Canadian Tire).

A **dissection kit** that includes scissors and forceps is also required and may be purchased at the York University Bookstore.

### Course Policies

#### **Missed Midterm, Lab Exam or Final Exam:**

Any student who is absent from the mid-term or lab exam without a valid reason will receive a grade of zero for the test they missed. There will be **NO** make-up exams for mid-term or lab exams. If you miss the final exam, you will have to petition for deferred standing, and if you become eligible, you will have to write the final exam during the deferred exam dates scheduled by the Registrar's Office or Course Director.

Students who feel that there are extenuating circumstances that may interfere with their ability to successfully complete the course requirements are encouraged to discuss the matter with Prof. Paluzzi **as soon as possible**.

Students with physical, learning or psychiatric disabilities who require reasonable accommodations in teaching style or evaluation methods should consult with the Office for Persons with Disabilities (OPD) and ensure that requests for appropriate accommodations are arranged with Prof. Paluzzi early in the term.

#### **Missed Laboratories:**

Your attendance in the lab is mandatory and will be recorded each week. If you do not attend the lab, you must provide valid documentation (e.g. doctor's note), and if valid documentation is not provided, you will be penalized up to 2.5% per lab missed (of your final grade). You must attend the laboratory in order to submit a report.

### 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](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-and-or-harassing-behaviour-in-academic-situations-senate-policy/>