This syllabus is a general representation of the course as previously offered and is subject to change.

BIOL 454 – Comparative Animal Physiology

General Course Syllabus (as of January 2020)

About the Course:

Course Description: This course explores selected topics in the physiology of vertebrate and invertebrate animals, with an emphasis on basic principles of physiology and comparisons on how these can either be conserved or differ among phylogenetically diverse animal groups.

Beyond the fascinating course content, guest speakers with international renown, and the opportunity to develop and hone analytical and presentation skills, this course is an excellent introduction to and preparation for post-graduate education.

Course Format: Lecture
Credits: 3
Prerequisites: One of BIOL 362, BIOL 364. (BIOL 457 an asset).

Course Learning Objectives:

The goal of this course is to introduce students to current and topical questions in comparative physiology through a combination of lectures, invited seminars, review of the primary literature, class discussions, individual term papers and oral presentations.

Textbooks and Additional Resources:

Lecture notes and reprint PDFs will be posted on Canvas (canvas.ubc.ca).

There is no required textbook, but the following texts may be useful:

1) Moyes, CD and Schulte, PM. Principles of Animal Physiology. Benjamin Cummings, New York, 1st Edition.
2) Randall, Burggren and French. Eckert Animal Physiology: Mechanisms and Adaptations. W.H. Freeman and Company, New York, 5th Edition, 2002.
3) Willmer, Stone and Johnston. Environmental Physiology of Animals. Blackwell Science Ltd. 2000. (QP82. W48 2000).
4) Schmidt-Nielsen. Animal Physiology: Adaptation and environment. Cambridge University Press.

Evaluation:

Assessment	Weight
Term paper & presentation - Final version of Term paper: 30% - Oral Presentation of Term paper: 20%	50%
Peer review of colleagues' term paper	10%
Participation - Questions, Attendance, Seminars	20%
Midterm oral exam	20%

DETAILS ON ASSESSMENTS:

1. Term paper and Oral Presentations

Students will write a term paper with a partner. Because physiology is such a diverse field, this paper offers the opportunity to explore a system of the student's choice in depth. The basic question to guide the selection of a topic is broad: What physiological/biochemical adaptation allows an organism to live where it does or function the way it does?

The term paper will be 15-20 double-spaced pages (times Roman 12 font, not including references and figures). The paper will focus on describing a physiological process or system, and the implications this has for the organism and/or the environment it inhabits.

To allow enough time for research and narrowing down the scope, students will be asked to submit a title at the end of the 2nd week and an outline by the end of the 4th week. A draft of the term paper will be due in the 7th week of classes, and will be anonymously distributed to two other students within the class, who will critique the term paper and provide constructive criticism (peer review). The purpose of this is two-fold. Foremost, students receive feedback on the draft, which will likely lead to improvements for the final version of the term paper that is graded by the instructor. Regardless, the comments received must be addressed. The final version of the paper will therefore contain a rebuttal section, in which students list the suggestions and either briefly explain how they were incorporated or rebut the comment.

The topic of the term paper will be orally presented in a 20-min Powerpoint presentation, followed by questions during the last few weeks of class.

2. Peer review of term Paper

The peer review of the term papers (as explained above) will be evaluated (10% of final grade) as well as being passed on to the author of the term paper. Peer review is a critical part of the publication process in science.

3. Participation

Students' active participation in this course will be evaluated in two ways:

A. Attendance at the Comparative Physiology seminar.
Students are expected to attend any 5 seminars of their own choice throughout the semester and write a short paragraph (1 page maximum), describing the seminar speaker's main objectives, the main findings and their overall impression of the seminar. If students are unable to attend seminars due time conflicts, the instructor can provide alternate suggestions.

B. Class participation.
Participation will be evaluated for the lectures and, especially, the term paper oral presentations. To maximize participation in lectures, it is important for students to always read papers carefully beforehand so that they come prepared to participate.

4. Midterm oral

Students are responsible for having a general understanding of the lecture material and their knowledge will be assessed in a short (<15 min) oral quiz during which they will be asked a series of short questions that relate to the major points or principles highlighted in the lectures. These are not yes/no answers to questions, but more "explain why this is so" types of questions. It could also be "draw a graph that relates X to Y." The oral midterm covers all lecture material and assigned readings from the primary literature preceding the exam.

Schedule of Topics

(Subject to modification. The schedule below is a sample from 2018W2).

Week	Lecture	Topic
1	Introduction	- Course outline and expectations
2	Gas exchange Gas exchange	- Enhanced O_2 delivery in fish - Gas exchange in insects - **Term paper title due**
3	Gas exchange	- Evolution of air-breathing in fish - High altitude flight in barhead geese
4	Temperature	- T optima and Q10 - Evolution and endothermy - **Term paper outline due**

5	Temperature Ionoregulation	- Freeze tolerance in insects - Smoltification in pink salmon
6	Ionoregulation Acid-base regulation	- Climate change and pink salmon - CO_2 tolerance in fish
7	Acid-base regulation Acid-base regulation	- Ocean acidification in fish - Evolution of acid-base regulation - **First draft of term papers due**
8	Scaling Midterm Oral Exam	- Interspecific scaling - **Midterm Oral Exam** - **Peer review of term paper due**
9	**Midterm Oral Exam** Student Presentations	- **Midterm Oral Exam** - Term paper presentations, 2 per class - **Final draft of term papers due**
10 - 13	Student Presentations	- Term paper presentations, 2 per class

University Policies:

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence.

UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom.

UBC provides appropriate accommodation for students with disabilities and for religious, spiritual and cultural observances.

UBC values academic honesty and students ae expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

Details of the policies and how to access support are available on the UBC Senate website.