

EEB 328F
PHYSIOLOGICAL ECOLOGY

Purpose: To provide a mechanistic understanding of the physiological processes governing the success and distribution of terrestrial organisms in their natural environments.

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Office Hours: By appointment any time. Appointments can be made at your convenience. Please use E-mail, phone or see me in class to set up an appointment.

Grades: Tutorial report - 15% Mid-term - 35% Participation - 10%
Final - 40% (final exam period)

Exams will primarily be essay in nature, featuring essay questions that encourage you to integrate concepts. There will be one tutorial report (in the energy balance section) for 15% of the grade.

Lecture Notes and Handouts: I will post class handouts (complex graphs, diagrams and photos) that I will use in lectures and tutorials. These will usually be posted the night before a class. Many of the lecture materials are presented via chalk on a blackboard.

Textbooks and Readings: No assigned text is used in this class. A reading packet of relevant text material will be on e-journals or the course Blackboard website. Journal articles can be accessed via e-journals on the U of T library website.

Reading Assignments For Week #1

1. Hochachka PW and Somero GN. (2002) Biochemical Adaptation: Mechanism and Process in Physiological Evolution. Oxford University Press. Read Chapter 7. Temperature. pp. 290-323 and 351-358. **This book is available as an electronic edition through the U of T e-library. You can access it at <http://lib.myilibrary.com.myaccess.library.utoronto.ca/Open.aspx?id=47035>**

2. Chapter 3 – The species in the environmental complex (pp. 33-56), in *Terrestrial Plant Ecology*, 3rd Edition, by Barbour M.G., Burk, J.H Pitts, W.D., Gilliam, F.S. and Schwarz, M.W. (1992) Benjamin Cummings, Menlo Park, CA USA. **On the course Blackboard website in the readings folder.**

LECTURE SCHEDULE
Friday 10 to noon, ESC 3087

Lecture slides are posted in the "Lecture Slides" folder on the Blackboard website for EEB328

Lecture #	Date	Topic
1	Sept. 13	Introduction – Physiological ecology as a discipline
2		Physiological tradeoffs using temperature as an example
3	Sept. 20	The tyranny of the Q_{10} of enzymes Energy budgets of organisms
5	Sept. 27	Energy balance case studies (Pat Friesen)
6		Cold and heat tolerance, alpine organisms
7	Oct. 4	Water properties, water flux, and water potential
8		Water acquisition and storage
9	Oct. 11	Water transport and cavitation in plants
10		Long-distance transport of fluids in animals
11	Oct. 18	Water stress and species distributions
12		Exam preparation tutorial (Q and A session)
13	Nov. 1	Photosynthesis
14		Sun-shade acclimation in plants and animals
15	Nov. 8	C_3 , C_4 and CAM photosynthesis
16		Photosynthetic responses to temperature and CO_2
17	Nov. 15	Oxygen issues in animals
18		
19	Nov. 22	Feeding strategies in large animals
20		Feeding strategies in small animals
21	Nov. 29	Feeding strategies in insects; feeding symbioses
22		Mineral nutrition of plants and consequences for animals Last Class

TUTORIAL SCHEDULE
Friday 1-3 PM, ESC 3087

The tutorial session is designed to provide students with a chance to explore in greater detail key issues than were presented in lecture, using demonstrations, extended discussion with questions, interactions with classmates, and informal interactions with the instructors. ***Tutorial outlines are posted before the scheduled class in the “Tutorial Outline” folder on the Blackboard website for EEB328.***

Week	Date	Subject
1	Sept. 13	Biological consequences of diffusion limitations
2	Sept. 20	Energy budgets – Equipment and techniques
3	Sept. 27	Calculate energy budgets
4	Oct. 4	Adaptations to extreme temperature environments Energy budget write-up is due
5	Oct. 11	Desert Organisms - case studies
6	Oct. 18	Hydraulic flux limitations in plants and animals
Midterm	Oct. 25	Midterm 1 to 3 pm in ESC 3087
7	Nov 1	Scaling laws and life, or why are big fierce animals so rare?
8	Nov. 8	Variation in the light environment (specialist versus generalist cases).
9	Nov. 17	Atmospheric change, C ₄ plants and animal evolution
10	Nov. 22	CAM, SAM and the salamander discussion
11	Nov 29	Zoo trip

The energy budget write-up is a summary of the results for the energy budget worksheet, including a written discussion (for 15 marks). Details to follow.