ANIMAL PHYSIOLOGY I

Calendar Description: Fundamental concepts in sensory, neural and behavioural physiology. The biochemical mechanisms whereby nerve cells detect and transmit information and the processes whereby information is integrated in the nervous system and gives rise to the outputs of behaviour. Three lecture hours, three laboratory hours. One term. Four credits.

Prerequisites: SC/BIOL 2020 3.0; SC/BIOL 2021 3.0; SC/BIOL 2030 4.0 (Students lacking prerequisites may be de-enrolled).

Course Director: Dr. C.G.H. Steel. Office: Room 010B Farquharson
Laboratory: Rooms 010/010A Farquharson
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Lectures:

Monday	1:30 - 2:30 p.m.	CB-121
Wednesday	1:30 - 2:30 p.m.	CB-121
Friday	1:30 - 2:30 p.m.	SLH-F

Laboratories: 3 hrs/week in one of the two rooms on one of the following days:

		Farquharson Rms. **206**	**OR**	**208**
Monday	2:30 - 5:30 p.m.	Sect. 04		Sect. 08
Tuesday	2:30 - 5:30 p.m.	" 01		" 05
Wednesday	2:30 - 5:30 p.m.	" 02		" 06
Thursday	2:30 - 5:30 p.m.	" 03		" 07

Labs start Monday, September 21st, 2015

Required Texts: 'Eckert Animal Physiology', 5th Edition (2002) by Randall, Burggren, and French. Freeman and Co. Available at the York University Bookstore.

Laboratory protocols will be available for downloading weekly.

Grading:

Term Test (October 23rd, 2015)	=	20%
Laboratory work:		
Four laboratory reports	=	17%
One laboratory test	=	18%
Final examination	=	45%
Total	**=**	**100%**

Other Information: The following topics will be discussed: cell permeability and exchange; nerve cells, impulses and neural transmission; coding of environmental stimuli by sense organs and physiology of the senses; integration in the nervous system; mechanisms and nervous pathways by which a particular stimulus leads to a particular behavioural response; plasticity in the nervous system, including learning; muscles and movement; hormones and other chemical messengers. Examples will be drawn from both vertebrate and invertebrate nervous systems.

LECTURE SCHEDULE

Cell Permeability and Exchange Mechanisms
Membrane structure and models
Mechanisms of exchange across membranes
Intercellular communication

The Nervous System, Ions and Excitation
Design of nervous systems; types of neuron
Origin and maintenance of the resting potential; action potential; cable properties
Ion channels; types, structure

Information Transmission
Electrotonic spread and regenerative propagation; non-spiking interneurons
Synaptic transmission - electrical and chemical
Neurotransmitters and neuromodulators

Muscle and Movement
Neural control of contraction; vertebrates and invertebrates
Muscle fibre types and their innervation
Muscle types and behaviours: flight, swimming

MID-TERM TEST FRIDAY OCTOBER 23rd, 2015

Sensory Mechanisms
Coding of environmental stimuli by sense organs
Chemoreceptors, stimulus transduction
Mechanoreceptors; physiology of the ear
Photoreceptors; visual pigments, colour vision

From Nerve Cells to Animal Behaviour
Neural circuits and behaviour: integration; pattern generators
Neural circuitry of behavioural pathways in simple animals

Hormones and Other Chemical Messengers
Receptors
Hormone action
The spectrum of neurochemical communication; multiple messengers from single cells

FINAL EXAMINATION: TO BE HELD IN PERIOD 9th – 23rd DECEMBER

LABORATORY SCHEDULE

Week of:	Lab #	Title	Written Report ?
Sept. 21 - 25	1	Properties of Membranes	Required
Sept. 28 - Oct. 2	2	Introduction to Powerlab and Labchart	No
Oct. 5 - 9	3	Compound Action Potentials	Yes
Oct. 13 - 16	4	Sensory Nerve Action Potentials (M students do lab #4 on Oct 26th)	Yes
Oct. 19 - 23	5	Skeletal Muscle	Yes
Oct. 26	(4)	Mon. students do lab #4 (no labs T,W,R)	Yes
Nov. 2 - 6	6	Physiology of Frog Heart (Cardiac Muscle)	Yes
Nov. 9 - 13	7	Vascular Smooth Muscle	Yes
Nov. 16 - 20	8	Sensory Physiology	Yes
Nov. 23 - 27	-	Lab exam review in lab period All lab reports to be returned	-
Nov. 30 – Dec.4	-	**LABORATORY EXAM** , 18% final grade. Each section on its customary day of the week. Marks will be posted during the week of Dec 14th.	

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 5% 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.