GRANDE PRAIRIE REGIONAL COLLEGE

Dept. of Science & Technology

COURSE OUTLINE

Winter 2011

ZOOLOGY 2420

Animal Physiology II – Intercellular Communication

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Description:

Communication among cells, coordination and body defense are explored in this course. Topics include the physiology of the nervous, sensory, motor, muscle, endocrine, reproductive and immune systems. Since physiological diversity in animals seems to be a property of nature, examples are used from vertebrates and invertebrates. The approach taken in this course is to view physiological adaptations from an ecological point of view and to look at the evolutionary forces that resulted in these adaptations.

We will emphasize the integrative nature of physiology and try to place each system into its environmental framework. An understanding of cellular and molecular physiology is crucial. While we look at each system, the question we are addressing is how different animals use very similar building blocks to construct unique physiological systems that help them meet the challenges imposed by their environments.

Prerequisites: BIOLOGY 1070

Transferability: Zoology 242, University of Alberta (a C- or more must be attained)

Textbook: Sherwood, L et al, Animal Physiology: From Genes to Organisms, 2005, Brooks/Cole, 759pp **(not required but recommended)**

Requirements:

This course is a 3-credit course that includes 3 hours of lecture and 1 hour of seminar each week, beginning the week of January 4thrd, 2011.

Since participation in lectures and completion of assignments are important components of this course, students will serve their best interests by regular attendance at both lectures and seminar sessions. Those who choose not to attend must assume whatever risks are involved. In this regard, your attention is directed to the Academic Guidelines of Grande Prairie Regional College. All assignments must be completed and handed in to the instructor by the date specified. Late assignments will not be marked.

Attendance and participation at all seminar sessions is compulsory. The objective of the seminars is to clarify information that has been presented in class during the previous week. Students are advised to review their notes prior to each seminar. Quizzes may be given during the seminar period.

Plagiarism will not be tolerated. Any student who plagiarizes will be given a zero on the assignment. A second case of plagiarism will result in expulsion from the course. The instructor reserves the right to use electronic plagiarism detection services.

Evaluation:	Seminar quizzes	10%
	Mid-term Exam I	25%
	Mid-term Exam II	25%
	Final Exam	40%

At the end of this course you will be assigned a letter grade. These letter grades correspond to percentages in the following way:

90-100	=	A+	67-69	=	C+
85-89	=	A	64-66	=	C
80-84	=	A-	60-63	=	C-
76-79	=	B+	55-59	=	D+
73-75	=	B	50-54	=	D
70-72	=	B-	0 –49	=	F

TOPIC OUTLINE

PART I:

1. Evolution and anatomy of the nervous system
2. Principles of electricity – voltage, current, resistance, capacitance
3. Membrane potential
4. Ion channels and action potentials
5. Propagation of action potentials along axons
6. Synaptic transmission – electrical vs. chemical transmission
7. Synaptic transmission – presynaptic and postsynaptic mechanisms
8. Synaptic transmission – integration and modulation
9. Neural integration
10. Simple reflexes and behaviour
11. Sensory physiology – general principles of transduction

12. Sensory physiology – diversity of receptors
13. Sensory physiology – auditory reception
14. Sensory physiology – visual reception
15. **MID-TERM EXAM I**

PART II:

16. Muscle physiology – sliding filament hypothesis
17. Muscle physiology – properties/regulation of muscle contraction
18. Muscle physiology – metabolic aspects
19. Neuroendocrinology – chemical messengers and regulators
20. Neuroendocrinology – first and second messengers
21. Neuroendocrinology – steroid hormones
22. Neuroendocrinology – non-steroid hormones
23. Neuroendocrinology – classification of hormones
24. Neuroendocrinology – endocrine glands and their hormones
25. Neuroendocrinology – hypothalamus/pituitary pathway
26. Neuroendocrinology – metabolic and developmental hormones
27. Neuroendocrinology – prostaglandins and sex hormones
28. Neuroendocrinology – insect endocrine system
29. **MID-TERM EXAM II**

PART III:

30. The immune system - overview
31. Immunology – the cellular basis of immunity
32. Immunology – the functional basis of antibodies
33. Immunology – the complement system
34. Immunology – T-lymphocytes and cell-mediated immunity
35. Immunology – hypersensitivity (autoimmune disease; allergies)
36. Immunology – applied immunology (AIDS; infectious disease)

PART IV:

37. Reproductive strategies
38. Reproductive systems in vertebrates
39. Reproductive systems in insects
40. Genetic determination of sex
41. Male reproductive physiology
42. Female reproductive physiology
43. **FINAL EXAM** (cumulative)