

GEORGE MASON UNIVERSITY
College of Health and Human Services

Course Number: GCH 710 (3:3:0)
Course Title: Principles of Applied Physiology I
Faculty: Randall E. Keyser, PhD, FACSM
Robinson Hall A
Room A401 D
Meetings by Appointment
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Course Description:

Examines the primary bioregulatory and communication systems. Part one of a detailed study of physiology for graduate students interested in health and human movement, chronic illness and disability.

Prerequisites*:

Minimum of

- One year introductory biology sequence with labs (100 level)

OR

- Two semester course sequence in anatomy and physiology (100 level)

* Similar courses approved for biological science majors may be substituted for 100 level courses

Recommended but not required

- General Chemistry (100 or 200 level)

*Students with other relative backgrounds or with courses specific to professional degrees may be admitted with permission of the course professor.

Student Behavioral Objectives: After completing GCH 710, Principles of Applied Physiology I students will be able to:

1. Explain the basic bioregulatory mechanisms in humans
2. Appraise general mechanisms of intra and intercellular communication operating in health and disease.
3. Evaluate the responses and adaptation of the bioregulatory mechanisms to perturbations typically associated with normal function, chronic disease, disability, and interventions such as exercise.

Required Text:

Textbook of Medical Physiology, 11th Edition: Arthur C. Guyton and John E. Hall. 2006, Elsevier/Saunders, Philadelphia. ISBN 0-7261-0240-1

Method of Evaluation:

Mid-term examination (50% of final grade)

Final Examination (50% of final grade)

Test method: Multiple K-type questions, Multiple Choice, True/False,
Possibly Short Answer Test and/or Essay Test

Grading: A = 85 – 100 %
B = 75 – 84.99%
C = 65 – 74.99%
D = 55 – 64.99%
F ≤ 54.99%

**Note: Grades will NOT be rounded up to the next higher integer

Estimated Time Commitment:

Class Contact Hours: 42 (3 hours each week for 14 weeks)

Class Preparation Hours: 86 to 126 (2-3 hours for each contact hour)

Examination Hours: 6 (3 Hours for Mid-term and 3 hours for Final Exams)

Exam Preparation Hours: 20 to 80 (10-40 per Exam)

Total Hour Commitment: 144 to 254 (9 to 16 per Week)

Students with Disabilities

If you are a student who has a disability and you need academic accommodations, please contact Debbie Wayne and the Disability Resource Center (DRC) at 703-993-2474. All academic accommodations must be arranged through the DRC.

Fall 2009 Class Schedule: GCH 710 Principles of Applied Physiology

Week	Meeting Date	Lecture Topic	Reading Assignment
1	August 31 st	Introduction	Chapters 1-3
2	Labor Day	NO CLASS	Read Ahead
3	September 14 th	Energy Metabolism I	Chapters 67-69
4	September 21 st	Energy Metabolism II	Chapters 70-73
5	September 28 th	Endocrinology I	Chapters 74-78
6	October 5 th	Endocrinology II	Chapters 79-83
7	October 12 th	Blood and Immunity I	Chapters 32-34
8	October 19 ^h	Blood and Immunity II	Chapters 25-36
9	October 26 th	Midterm Exam – Covers lectures and readings above	
10	November 2 nd	Neurophysiology I	Chapters 45, 46, 53

11	November 9 th	Neurophysiology II	Chapters 49-51
12	November 16 th	Neurophysiology III	Chapters 47, 48, 60, 61
13	November 23 rd	Neurophysiology III	Chapters 57-59
14	November 17 th	Neurophysiology IV	Chapters 54-56
15	November 30 th	Neuromuscular I	Chapters 4-6
16	December 7 th	Neuromuscular II	Chapters 7,8
17	December 14 th	Final Exam – Covers lectures and reading weeks 9 -15	

Description of Anticipated Lectures/Discussions

The classes will consist of lectures and discussions led by the course faculty, supplemented by electronic slides and other projected materials. The anticipated weekly lectures are described below.

- Week 1: Mechanisms of homeostasis, biological control systems, automaticity, cell organization, cell structure, functional systems of the cell, cellular locomotion, the genetic code, transcription, translation, cell products, gene function, cell reproduction, cell differentiation, apoptosis and cancer.
- Week 2: Metabolism of carbohydrates and formations of adenosine triphosphate, lipid metabolism, metabolism of proteins
- Week 3: The liver and metabolism, dietary balance, regulation of feeding, obesity, starvation, energetics and the metabolic rate, body temperature regulation and fever.
- Week 4: Endocrinology, pituitary hormones and the hypothalamus, thyroid hormones, adrenocortical hormones, insulin, glucagon, diabetes.
- Week 5: Parathyroid hormone, calcitonin, phosphate metabolism, vitamin D, male reproductive hormones, female physiology
- Week 6: Erythrocytes, anemia and polycythemia, leucocytes, granulocytes, monocytes-macrophages, inflammation, immunity and allergy.
- Week 7: Blood types, transfusion, tissue and organ transplantation, hemostasis and blood coagulation
- Week 9: Organization of the nervous system, synapses, transmitters, sensory receptors, neuronal circuits, hearing, taste and smell.
- Week 10: Optics, receptor and neural function of the retina, central neurophysiology of vision.
- Week 11: Central organization of the tactile and position senses, pain, headache and thermal sensations, the autonomic nervous system and the adrenal medulla, cerebral blood flow, cerebrospinal fluid and brain metabolism
- Week 12: Cerebral cortex, intellectual functions, learning and memory, behavior and motivation mechanisms of the brain, limbic system and hypothalamus, sleep, brain waves, epilepsy, and psychoses.
- Week 13: Motor function of the spinal cord, cortical and brain stem control of motor function, contributions of the cerebellum and basal ganglia to overall motor control
- Week 14: Transport of substances through the cell membrane (Sarcolemma), membrane potentials and action potentials, contraction of skeletal muscle.
- Week 15: Excitation of skeletal muscle, neuromuscular transmission and excitation-contraction coupling, contraction and excitation of smooth muscle.