

## Exercise Physiology II KINS4690/6690 Spring 2008

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

**Description** This class will cover skeletal muscle anatomy and physiology. This will include the motor nerve. An emphasis will be placed on the function of skeletal muscle and the response of skeletal muscle to exercise.

**Prerequisites** KINS4630 or permission of instructor

**Instructor** Kevin McCully, Ph.D., Professor  
115F Ramsey Student Center  
542-1129  
[mccully@uga.edu](mailto:mccully@uga.edu)

**Office hours** Tuesday 2:00 – 3:00pm, or by appointment

**Lab instructor** Leland Nielsen (M&W)  
Katy Lambourne (F)

**Meetings** Class Tuesday & Thursday 12:30 – 1:45 pm  
Room 114 Ramsey  
Labs Monday, Wednesday, Friday  
11:15am – 1:10 pm

**Textbook** Skeletal Muscle Form and Function, by MacIntosh, Gardiner, McComas. Human Kinetics. 2<sup>nd</sup> Ed. 2006. At the University Bookstore.

**Lab manual** Lab manual for KINS 4630L/6630L will be available on WebCT

<b>Evaluation</b>	Weekly quizzes	50%	Every Thursday
	Final Exam	30%	according to university schedule
	Laboratory	20%	weekly quizzes
	Online evaluation	0%	required but not graded
	Extra Credit	quiz replacement	‘device’ report

### Grading policy\*

To comply with new pilot grading system, 100-93 A, 92-90 A-, 89-87 B+, 86-83 B, 82-80 B-, 79-77 C+, 76-73 C, 72-70 C-, etc.

\*This is for undergraduates. Modifications for honors and graduate students are presented below.

If a student wishes to have an exam re-graded, she/he must submit in writing the nature of the problem, and the exam, no later than one week after the exam has been returned. The entire exam will be rechecked.

### **Honors and Graduate Credit**

Honors credit will require extra work. This may consist of a weekly journal report on a topic covered in class that week. Class participation and the report will make up 20% of the non-lab portion of the grade. Extra work for honors and graduate credit during lab will be arranged by the lab instructor.

**Attendance** Attendance of lectures is optional but encouraged. Most of the information on the exams will come from the textbook and the lecture slides. But some required information may only be presented in class. Attendance of all laboratory sessions and scheduled lecture exams is required. No make up exams or lab quizzes will be given unless official UGA excuse is given (i.e., medical leave, etc.). Students are required to notify course or lab instructor prior to an exam or quiz in order to obtain permission to reschedule an exam or lab session.

**WebCT** This course will make use of WebCT. Class information, quiz and exam results, and slides used in the class lectures will be posted on WebCT.

### **(1) Course objectives and expected learning outcomes**

know the key structural components of skeletal muscle cell anatomy  
know the key structural components of motor nerve anatomy  
know the principals behind resting and action potentials  
know the key steps of neuromuscular transmission  
know the key aspects of motor axon function  
know what muscle fiber types are and how they influence muscle function  
know the key steps in muscle contraction  
know the key steps in cross bridge cycling  
know how muscles are organized and the importance of motor units  
know the different mechanisms that determine muscle contractile force development  
know the key aspects of skeletal muscle metabolism  
know how to define skeletal muscle fatigue and the potential mechanisms of fatigue  
know how muscle adapts to decreased use, and the experimental models used to study decreased use  
know how spinal cord injury influences muscle function  
know how muscle denervation influences muscle function, in particular how this differs from spinal cord injury  
know how reinnervation occurs  
know how muscle adapts to increased use, and the experimental models used to study increased use  
know how to define and measure muscle injury

understand the key steps in skeletal muscle development  
know how genes and genetic modification can influence muscle function

**(2) Topical outline (approximately one topic per week)**

Muscle Architecture and Anatomy  
The Motor Neuron  
Motor Nerve Anatomy  
The Neuromuscular Junction  
Muscle Contraction  
Muscle Receptors  
Motor Neuron Axon Function  
Motor Units  
Muscle Metabolism  
Fatigue  
Denervation and Repair  
Disuse and Muscle Function  
Muscle Training  
Muscle Injury and Repair  
Genetic modification of muscle function

**(3) University Honor Code and Academic Honesty Policy**

All academic work must meet the standards contained in “A Culture of Honesty.” Each student is responsible to inform themselves about those standards before performing any academic work.

Copies of the honor code can be obtained from the Office of the Vice President for Instruction or may be viewed at the following web site:  
<http://www.uga.edu/ovpi/>

## **Study objectives**

### Lectures 1 & 2

- Describe the organization of skeletal muscle
  - Muscle to sarcomere
- Describe connective tissue in skeletal muscle
  - Layers of connective tissue
  - Purposes of connective tissue
  - Basement membrane
- Describe organization of skeletal muscle cells
  - Membrane and various organelles
  - Arrangement of organelles
  - Nuclei in skeletal muscle
- Describe proteins in skeletal muscle
  - Contractile proteins in sarcomere
  - Structural proteins
  - Excitation contraction coupling
- Describe fiber types
  - What are they
  - How are fiber types determined
- Describe the structure of connective tissue associated with skeletal muscle
  - Various layers
  - Proteins
- Describe the function of connective tissue in skeletal muscle
  - Engineering diagram
  - Viscoelasticity