

## Neuromuscular Exercise Physiology KINS4690/6690 Fall 2017

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

**Description** This class consists of two components: 1) the structure and physiology of skeletal muscle function, and 2) applied skeletal muscle physiology with an emphasis on exercise, fatigue, disuse, disease, and injury.

**Prerequisites** KINS4630 or permission of instructor

**Instructor** Jarrod Call, Ph.D., Assistant Professor  
115 G Ramsey Student Center  
706-542-0636  
call@uga.edu

**Office hours** By appointment

**Lab instructors** Chester Sokolowski, Ewan Williams, Eddie Green

**Meetings** Class Mon, Wed, Fri 11:15 – 12:05  
Room Ramsey 202  
Labs W 1:25-3:20; F 12:20-2:15; F 8:00-9:55  
Final Exam Monday December 11 (12:00 – 3:00 PM)

**Textbook** None required. Optional: Skeletal Muscle: Form and Function by MacIntosh, Gardiner, McComas

**Lab manual** Lab manual for KINS 4690L/6690L will be available on eLearning Commons

<b>Evaluation</b>	Quizzes*	35%	
	Exam 1**		
	Exam 2**		
	Exam 3**	20%	(Cumulative Exams 1-3)
	Final Exam***	25%	
	Laboratory	20%	
	Online evaluation	0%	Required, not graded

**Notes** \* No quiz grades are dropped  
\*\* Mini-exams, larger than quizzes  
\*\*\* Cumulative Final

**Extra Credit** Extra credit questions will be given on exams.

**Grading policy\*\***

To comply with new pilot grading system, 100-92 A, 91-90 A-, 89-88 B+, 87-82 B, 81-80 B-, 79-78 C+, 77-72 C, 71-70 C-, etc.

\*\* There is no rounding of grades. For example, a 91.95% is an A-.

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 and graduate credit will require extra work. This includes two brief presentations to the class and short essay questions on the final exam.

**Attendance**

Attendance of lectures is optional but encouraged. All of the information on the exams will come from the lectures. 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 eLC New. Class information, quiz and exam results, and slides used in the class lectures will be posted on eLC New.

**(1) Expected learning outcomes (see detailed course objectives)**

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 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 (See detailed lecture outline)**

Skeletal muscle anatomy	Fat metabolism
Connective tissue	Carbohydrate metabolism
Muscle function and movement	Circulatory system hemodynamics
Muscle development	Microcirculation and regional flow
Cell communication-Nerve	Blood flow during exercise
Physiology	Resistance training
Neuromuscular junction	Endurance training
Membrane excitability, ions and pumps	Muscle fatigue
Excitation-contraction coupling	Muscle disuse
Sarcomere	Spinal cord injury
Cross-bridge cycle	Inactivity
Muscle fiber type	Aging
Motor units	Duchenne muscular dystrophy
Properties of muscle contraction	Mechanisms of muscle injury
Assessing muscle contractility	Physiology of muscle injury
Mitochondria	Satellite cell and muscle repair
	Age and sex differences in muscle injury
	Improving muscle recovery

## **(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/honesty/acadhon.htm>

## **(4) Non-Discrimination and Anti-Harassment Policy**

The University of Georgia (“the University”) is committed to maintaining a fair and respectful environment for living, work and study. To that end, and in accordance with federal and state law, University System of Georgia policy, and University policy, the University prohibits harassment of or discrimination against any person because of race, color, sex (including sexual harassment and pregnancy), sexual orientation, gender identity, ethnicity or national origin, religion, age, genetic information, disability, or veteran status by any member of the University Community (as defined below) on campus, in connection with a

University program or activity, or in a manner that creates a hostile environment for any member of the University Community. Incidents of harassment and discrimination will be met with appropriate disciplinary action, up to and including dismissal or expulsion from the University. For information, please go to <https://eoo.uga.edu/policies/non-discrimination-anti-harassment-policy>

**(5) Campus Carry House Bill 280**

**Handguns are prohibited from athletic sporting event facilities, such as the Ramsey Center where class is held.** For information on HB 280, please go to <http://www.policies.uga.edu/FA/nodes/view/1263/Weapons-Prohibited-on-Campus>