

APPLICATION FOR NEW COURSE

- 17. [X] The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.
18. [] Check box if course is 400G or 500. If the course is 400G- or 500-level, you must include a syllabus showing differentiation for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See SR 3.1.4)

19. Within the department, who should be contacted for further information about the proposed new course?

Name: Carl G. Mattacola PhD, ATC Phone: 323-1100 x80860 Email: carlmat@uky.edu

20. Signatures to report approvals:

2/4/08
DATE of Approval by Department Faculty

Judith Page Judith Page
printed name Reported by Department Chair signature

2/04/08
DATE of Approval by College Faculty

Sharon Stewart Sharon Stewart
printed name Reported by College Dean signature

* DATE of Approval by Undergraduate Council

printed name Reported by Undergraduate Council Chair signature

* DATE of Approval by Graduate Council

printed name Reported by Graduate Council Chair signature

3/14/08
* DATE of Approval by Health Care Colleges Council (HCCC)

Heidi Anderson Heidi Anderson
printed name Reported by Health Care Colleges Council Chair signature

* DATE of Approval by Senate Council

Reported by Office of the Senate Council

* DATE of Approval by University Senate

Reported by Office of the Senate Council

*If applicable, as provided by the University Senate Rules

Muscle Mechanics
AT 700
The University of Kentucky
Division of Athletic Training

Instructor

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Office hours: by appt.

Course Description

This is an elective, advanced athletic training course encompassing a wide range of topics related to all aspects of skeletal muscle form and function. The primary focus of this course will be on the mechanical properties of skeletal muscle, and translational aspects of basic science research and clinical care.

The course goal is to gain an advanced understanding of muscular contraction, muscle properties and experimental approaches to studying muscle. Secondary to this goal, is to translate the mechanical and physiological properties of skeletal muscle to athletic performance, and muscle injury and rehabilitation.

Instructional Strategies

The class will meet formally for 1.5 hours, two times per week. Instructional strategy will include lecture, discussion and formal student presentations.

Assigned Readings

See attached list

Required Texts

None

Optional References

- **Theoretical Models of Skeletal Muscle**, 1998, Walter Herzog and Marcelo Epstein
- **Muscle Pain**, 2001, Siegfried Mense and David Simons
- **Biomechanics of Musculoskeletal Injury**, 1998, William Whiting and Ronald Zernicke
- **Skeletal Muscle Form and Function**, 2006, Brian Macintosh, Philip Gardiner and Alan McComas

Content

1. **muscle morphology**
2. **the cross-bridge theory**
3. **mechanical properties of muscle**
4. **electromyography**
5. **muscle inhibition**
6. **in-vivo muscle function**

University Policies:

Excused absences: The instructor expects everyone to attend every class and be on time. Attendance and punctuality will be tallied by the instructor and contributes to your class participation score. Each unexcused absence will account for 2% deduction from the class participation percentage. Therefore if you have 5 unexcused absences you will receive no credit for class participation which will account for 10% of your total grade. See Grading criteria below. Acceptable reasons for excused absences are listed in *Student's rights and Responsibilities, Section 5.2.4.2*. Briefly, these include serious illness, illness or death of someone in the student's immediate family, University sponsored trips, major religious holidays, and other circumstances the instructor finds reasonable. NOTE: If you intend to be absent to observe a major religious holiday, you must notify Dr. Butterfield *in writing* by Jan 29.

When there is an excused absence, you will be given the opportunity to make up missed work and/or exams. It is the student's responsibility to inform the instructor of the absence, preferably in advance, but no later than one week after the absence.

Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the immediate family. The University Health Services (UHS) will no longer give excuses for absences from class due to illness or injury. UHS forms can be date stamped to show that students went to the trouble of going to University Health Service, but it does not mean that students actually saw a physician or a nurse. If the faculty member wants further verification that a student kept an appointment with University Health Services (especially when there have been multiple or prolonged absences from class), the student will need to sign a release of information form (available from UHS) that will give permission for the staff to talk with the faculty member.

Withdrawal: Students should refer to *the University Senate Rules, Section V, 1.3.4 and 1.8-1.8.3* or *Student Rights and Responsibilities*.

Incompletes: Students should refer to *the University Senate Rules Section V, 1.3.2* or *Student Rights and Responsibilities*.

Inclement weather: In case of inclement weather or emergencies, class will be held unless the University administration cancels classes. For University closing of classes and offices, call the UK Infoline at 257-5684 or check UKTV Cable Channel 16. Students should use their judgment about coming to class.

Cheating and Plagiarism: Revised Senate rules in regard to penalties for academic offenses are in effect. A summary of these changes may be found at <http://www.uky.edu.Ombud>. The consequences for offenses have become more flexible and should be reviewed carefully.

Cell Phone Policy: Cell phones, ipods, pagers, etc. should be turned off and out of sight during class time.

Classroom and Learning Accommodations: Instructors will make reasonable accommodations for physical and/or learning disabilities that could inhibit student academic success. The Disability Resource Center certifies the need for and specifies the particular type of such accommodations on a student-by-student basis. Students seeking accommodations must submit this certification to the faculty. Contact the Center staff at 257-2754.

Writing Skills: Helping promote scholarship is more than simply teaching the subject matter -- all students need to improve and refine their skills in verbal and written expression. Regardless of discipline, faculty have the right -and the obligation- to expect students to use English properly in all aspects of the course (S.R.5.2.4.3). Instructors may ask students to rewrite papers, make writing style one of the grading criteria, and report a seriously deficient student to his/her college for remedial work.

Topics:

Week 1	Introduction: What is graduate school? What is academic scientific research? How does muscle contract? Organization of Class and expectations
Weeks 2 &3	Structure: Muscle Neuromuscular junction Motors units Actin, myosin, cross-bridges, sarcomeres
Weeks 4&5	The cross-bridge theory: Sliding filaments Huxley 1957 Huxley 1969 Huxley and Simmons 1971- Rayment et al. 1993
Week 5	Quality of the cross-bridge theory: Gerry Pollack's scientific research Phase transition and muscle contraction
Weeks 6&7	Muscle properties: The force-length relationship Sarcomere Fiber Muscle Importance in performance? Importance in injury and rehabilitation
Weeks 8&9	Muscle properties: The force/power-velocity relationship Slow vs fast fibers Structural considerations
Weeks 10&11	Muscle properties: So what? Connecting the dots Performance, injury and rehabilitation considerations
Week 12	EMG Surface, indwelling electrodes Measurement techniques Analyses
Weeks 13&14	In-vivo muscle properties: Isometric Concentric Eccentric Muscle strain injury, adaptation and rehabilitation

Grading:

A = 90 – 100; B = 80-89; C = 70 – 79; E = 69 and below

Activity	weight
Article review / presentation	10%
Class Participation	10%
Exam 1	20%
Exam 2	20%
Exam 3	20%
Final Exam	20%

Class Participation:

- A - Highly Prepared for AND actively engaged in class discussions
- B- Moderately prepared for OR moderately engaged in class discussions
- C- Questionable preparedness for OR little participation in class discussions
- E- No participation in class discussions