
Instructor: Dr. Brian MacIntosh	Room: KNB 133
Phone: 220-3421	Days: MWF
Email: brian.macintosh@ucalgary.ca	Time: 14:00 to 14:50
Office: KNB 2212	Course Website: On Blackboard
Office Hours: by appointment	

Course Description:	The structural organization, neural control, contractile consequences and determinants of energy cost of contraction of skeletal muscle will be studied in detail
Prerequisites:	Students taking this course must have already taken Exercise Physiology (KNES 373).
Course Objectives:	<p>This course investigates the detail of muscle structure and function, including changes associated with a variety of diseases and the impact of chronic use or lack thereof. Topics deal with the fundamental properties of skeletal muscle, including structure, neural control of contraction, and the consequences of activation of muscle. Students are expected to achieve the following objectives:</p> <ol style="list-style-type: none">1. to understand the structural organization of skeletal muscle with respect to neural connections, muscle architecture including macroscopic and microscopic aspects of motor units and muscle cells, and sensory organs of the muscle2. to understand the ionic basis of activation of skeletal muscle3. to learn how muscle contraction is regulated4. to understand the plasticity of muscle in response to use, disuse, injury and aging5. to understand the basics of skeletal muscle energetics, and metabolism6. to improve writing skills
Required Reading Materials:	The required textbook for this course is: MacIntosh, B.R., Gardiner, P.F, & McComas, A.J. (2006). Skeletal Muscle: Form and Function . 2 nd Edition, Human Kinetics, Champaign, Ill. Additional resource material will be placed on Blackboard. Lecture notes will be placed on this site prior to any lecture.
<u>Contacting the Instructor:</u>	Students requiring assistance are encouraged to speak with the instructor during/immediately after class or arrange an appointment. Should you wish to meet with the instructor, please phone or email the instructor to make an appointment. Questions relating to course material, and the response from the instructor, may be posted (anonymously) to Blackboard. Email, is the most effective method of communication with your instructor, but the volume of e-mail received may slow the response time. If you have not received a suitable response within 24 hour, resend your request or contact the instructor

by phone.

Grading Scale:

Grade	Percent	Grade Point Value	Description
A+	93.0 & above	4.00	Outstanding
A	89.0-92.9	4.00	Excellent - superior performance, showing comprehensive understanding of subject matter.
A-	85.0-88.9	3.70	
B+	81.0-84.9	3.30	
B	77.0-80.9	3.00	Good-clearly above average performance with knowledge of subject matter generally complete.
B-	73.0-76.9	2.70	
C+	69.0-72.9	2.30	
C	65.0-68.9	2.00	Satisfactory – basic understanding of the subject matter. Grade point average below 2.00 is not sufficient for promotion.
C-	61.0-64.9	1.70	Minimum grade required if needed as a prerequisite
D+	55.0-60.9	1.30	
D	50.0-54.9	1.00	Minimal pass – marginal performance; generally insufficient preparation for subsequent courses in the same subject.
F	49.9 & below	0	Fail – unsatisfactory performance or failure to meet course requirements.

Evaluation of Course Content:

Evaluation: Evaluation in this course will be based on the following: midterm and final exams and two term assignments. Your best five o count toward 10% of your grade (2% each). These quizzes may or r and will be based on current lecture material and reading assignmen exams will be cumulative, covering material studied since the beginn emphasis on material covered since the midterm on the final exam. term assignments are given at the end of this course outline.

classroom quizzes:	10 %	anytime
Preliminary writing exercise	5 %	due Nov 9 (not accepted after Nov 9)
midterm exam:	20 %	Oct. 29
term paper:	25 %	due: Nov 28 (with auto extension to Dec 3 for those who need it... no more. Papers will not be accepted after the extended deadline).
final exam:	40 %	scheduled by the Registrar

Final Examination:

To be scheduled by Registrar's Office.

LECTURE SCHEDULE and READING ASSIGNMENTS

Date	Topic	Reading
Sept 10	Introduction to the course and learning expectations	
Sept 12,14	Skeletal muscle structure and missing parts	(Part 1 & Chapter 1)
Sept 17,19	The motoneuron: the conductor of muscle activity	(Chapter 2)
Sept 21,24	Neuromuscular Junction: getting the message across	(Chapter 3)
Sept 26,28	Muscle receptors: do muscles have sense?	(Chapter 4)
Oct 1, 3	Ion channels, pumps and binding proteins: the orchestra	(Part 2 intro & Ch 7)
Oct 5	Axoplasmic transport, and treatment of cancer	(Chapter 8)
Oct 8,	Thanksgiving	
Oct 10, 12	Nerve membrane properties: getting excitable	(Chapter 9)
Oct 15, 17	Neuromuscular transmission: signaling across gaps	(Chapter 10)
Oct 19, 22, 24	Muscle contraction: and runaway heat generation	(Chapter 11)
Oct 26	Activity-dependent potentiation: Can this be "warm-up"?	(supplements)*
Oct 29	Midterm exam	
Oct 31	Motor units: organizing of the contractile properties	(Chapter 12)
Nov 2	Exercise: orderly and disorderly motor unit recruitment	(Chapter 13)
Nov 5, 7	Skeletal muscle energetics: Where is the energy crisis?	(Ch 14 and suppl)
Nov 9	Fatigue: is this just avoiding catastrophe	(Part 3 Intro & Ch 15)
Nov 14	More Fatigue: Introducing the Peripheral Governor	(supplement)
Nov 16	Loss of innervation: paralysis	(Chapter 16)
Nov 19	Recovery of muscle innervation: a slow process	(Chapter 17)
Nov 21	Neurotrophism: chemical signals maintain and enhance	(Chapter 18)
Nov 23	Disuse: use it or lose it	(Chapter 19)
Nov 26, 28,	Muscle training: using it makes it better	(Chapter 20)
Nov 30	Injury and repair: accidents do happen	(Chapter 21)
Dec 3, 05	Aging: is it inevitable?	(Chapter 22)
Dec 07	Catch-up and Review	

* "supplements" in the reading assignment refers to supplementary material which will be available to the students. This material will be prepared by the instructor, or will be specific published work, and will be placed on "Blackboard" for this course.

TERM PAPER

As indicated in the evaluation section of this outline, you must submit a preliminary paper and a term paper as part of the requirements for this course. The **term paper** will be an essay describing current advances in our understanding of the fundamental properties or structure of skeletal muscle. Choose a topic from the list posted on Blackboard. Pay particular attention to recent publications on the topic you choose. The paper must be typed, with line & a half spacing, using no smaller than 12 pt font, and the general format will be that as described below. The **preliminary paper** will be a two-page preliminary version of this paper. A title page and reference list should accompany the preliminary paper, but an abstract is not needed. The term paper must not exceed 8 pages, excluding title page, abstract, references and figures. Allowable topics will be presented in class, and posted to Blackboard. Errors in formatting will result in delays in marking, or no mark at all. Please follow these simple and complete formatting guidelines. **NOTE: THESE ARE NOT APA GUIDELINES!**

Title Page: The title page should include only the following: title of your essay, your name and ID number, course name and number, and the name of the instructor. This is considered page 1, but no page number should appear on this page. You may select a running header for your essay. This header will appear at the top of each page after (but not on) the first page.

Abstract: Present a one-page summary of your essay. This abstract must not exceed 250 words, and should immediately follow the title page. The abstract should be followed by a selection of up to five key words that could be used to access the literature related to this topic. The key words should be listed on the same page as the abstract, and this should be numbered page 2, in the top right hand corner. It is not appropriate to include references in an abstract.

Paragraphs: Your preliminary paper and your term paper must be composed with appropriate English grammar. This means that statements must be complete sentences, and sentences must be presented in paragraphs. A paragraph is a collection of sentences that deal with a specific topic. There should be an introductory sentence that gives the reader some direction. This is followed by a logical presentation of the material relevant to the theme of the paragraph. It is usually appropriate to have a concluding sentence, at the end of your paragraph.

Introduction: In this part of the essay, which begins with page 3, you will identify the topic that you will address and outline the key features that will comprise your essay. Describe the approach you will take in your essay to prepare the reader for what is to follow. In the Introduction, the purpose of the paper should become clear (i.e. the purpose of the paper is to describe some key concept in skeletal muscle anatomy or physiology, or to present and resolve controversy). There are several sources of information that you should consult in preparing your paper.

Body of the Paper: In this part of your essay, you can use subheadings (related to the points raised in the introduction) and elaborate on the topic that will form the bulk of your paper. This portion of the essay may be further broken down with subheadings relating to various aspects of the topic, and types of evidence under consideration. Do not merely reiterate the conclusions of other authors. ***Critically evaluate their conclusions based on the data that are available.***

Conclusions: Summarize your findings and present your opinion on the topic that you have presented.

References: List all of the literature that has been cited within the essay, using the format that is used in Applied Physiology, Nutrition and Metabolism. In this journal, citations are noted in the text by listing the author's name(s) and year of publication, and by listing the cited journal articles in alphabetical order at the end of the paper. Consult this journal for appropriate examples of this citation format.

Figures: You may use figures (graphs and/or diagrams) to illustrate a point. Figures can be borrowed from other sources, or you can create your own figure to help describe some aspect of your essay. If you borrow from another source, then cite that source, giving credit to the author. Figures can be placed within the body of the essay close to where they are referred to, or at the end of the paper, following the reference list. Each Figure should have a "caption" describing the content and/or relevance of that figure.

Supplementary Course Information

In accordance with the University of Calgary Calendar

<u>Academic Accommodation Awareness Information:</u>	It is the student's responsibility to request academic accommodation. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 220-8237. You are also required to discuss your needs with your instructor no later than fourteen (14) days after the commencement of this course. Students who have not registered with the Disability Resource Centre <u>are not</u> eligible for formal academic accommodation.
<u>Plagiarism/Cheating/Other Academic Misconduct:</u> (see Calendar)	A <u>single</u> offence of cheating, plagiarism, or other academic misconduct is a serious act that will not be tolerated in the Faculty of Kinesiology. Penalties for such acts will be determined by the Dean and may result in a failing grade, probation, suspension, or expulsion. Any student who is uncertain if an action falls into this category should consult the instructor and/or the Calendar.
Midterm Exam Policy:	The Faculty of Kinesiology policy is that all students are expected to write midterm exams on the dates listed on the course outline. Special accommodation may be granted by the instructor in <u>exceptional circumstances only</u> which include illness, participation in athletic events (varsity, national or international), domestic affliction, and religious conviction. It is the student's responsibility to supply proper documentation and/or notification <u>prior</u> to the originally scheduled midterm to support their circumstance. Personal travel plans and arrangements are <u>not</u> valid reasons for requesting a special accommodation for a midterm exam. Failure to comply with this policy will result in a grade of zero for the midterm and possible failure in the course.
FOIP Policy:	Please note that the University is under the jurisdiction of the provincial Freedom of Information and Protection of Privacy (FOIP) Act. Please refer to the website for details: http://www.ucalgary.ca/secretariat/privacy
Internet and Electronic Communication Device Information:	Any surfing of the Internet during lectures that is not directly related to the class discussion is distracting and strictly forbidden. Additionally, the use of any electronic devices (e.g., cellular phones, Blackberrys) for e-mailing, texting, etc. is strictly prohibited. Please turn OFF your phone before the beginning of each lecture. Instructors have the authority, at the discretion of the dean of their faculty, to require that specific course assignments, term papers and academic exercises be submitted in an electronic format. Instructors cannot require that multiple copies of an assignment be submitted.
Emergency Evacuation/Assembly Points:	For classes in the Kinesiology buildings Primary assembly point is the MacEwan Student Centre - North Courtyard and the Alternate assembly point is University Theatres Lobby
Safewalk Information:	Safewalk volunteers walk people safely to their destination on campus (including Health Sciences, Children's Hospital, McMahon Stadium, and University LRT station). This service is free and available to students, staff and campus visitors. Call 403-220-5333 (24 hours a day/7 days a week/365 days a year).
Students' Union:	The Kinesiology Representative is Calindy Ramsden- E-mail: kinesrep@su.ucalgary.ca .