

**ANSC (FSTC) 607 SYLLABUS AND SCHEDULE
PHYSIOLOGY AND BIOCHEMISTRY
OF MUSCLE AS A FOOD
MW 3:00 – 4:15
Kleberg 123**

INSTRUCTOR: Stephen B. Smith

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Course website: <http://animalscience.tamu.edu/academics/courses/ansc-grad/anscfstc-607/>

Office hours: Drop in or by appointment

OBJECTIVES:

Upon completion of this course, the student should be able to:

1. Describe muscle metabolism both antemortem and postmortem.
2. Demonstrate familiarity with the various models of muscle contraction.
3. Describe the conversion of muscle to meat.
4. Discuss growth, development, and innervation of muscle.
5. Describe the relationship between the motor unit and strength of contraction.

REQUIRED READING MATERIAL:

TEXT. None required.

REPRINTS. Copies of reprints relevant to the class lectures will be distributed to the students by e-mail as pdf files. **Portions of this material will be included in the exams.**

GRADING: A = 90-100%; B = 80-89%; C = 70-79%; D = 60-69%; F = 59% or lower

EXAMS:	Midterm I*	50 points
	Midterm II	50 points
	Midterm III	50 points
	Midterm IV	50 points
	Quizzes**	40 points
	Final (20% new, 80% review)	<u>100</u> points
TOTAL		340 points
TOTAL FOR GRADE BASIS***		290 points

*There will be four midterms, each covering the material from five lectures. The final exam will cover lecture material from the last section plus material from the previous midterms.

Twenty, two-point quizzes will be given throughout the semester. The quizzes are designed to encourage students to study ahead for class and reinforce exam material. **There are no make-up quizzes, but students will not be penalized for missing quizzes due to excused absences (total quiz score will be adjusted accordingly). Excused absences include illnesses, scientific meetings in which the student is required to attend, and unavoidable laboratory research.

***Students are allowed to drop one midterm (Midterms I – IV). **Students are required to take all midterms and the final, but students are allowed to miss one midterm for excused absences.** Students who do not miss any midterms may drop the midterm with the lowest score. **Students who miss two midterms (excused or otherwise) are required to take a midterm that includes information from both missed midterms.**

***AGGIE CODE OF HONOR:** An Aggie does not lie, cheat, or steal, and will not tolerate those who do.*

AMERICANS with DISABILITIES ACT (ADA) POLICY STATEMENT:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 979-845-1637. For additional information visit <http://disability.tamu.edu>.

LECTURE OUTLINE

SECTION I. MUSCLE STRUCTURE AND METABOLISM

August

29 Introduction to the class.

SECTION I. MUSCLE STRUCTURE AND CONTRACTION

31 General cell structure. Muscle structure and fiber types

September

5 Muscle ultrastructure

7 Motor innervation and contraction

12 The motor unit, force of contraction, and muscle fiber recruitment

14 Models and kinetics of muscle contraction

19 **MIDTERM I (Muscle Structure and Contraction)**

SECTION II. MUSCLE CARBOHYDRATE METABOLISM

21 Enzyme kinetics and control reactions

26 Glycolysis

28 The tricarboxylic acid (Krebs) cycle

October

3 Glycogen synthesis

5 Glycogen degradation

10 **MIDTERM II (Carbohydrate Metabolism)**

SECTION III. CONVERSION OF MUSCLE TO MEAT

12 Postmortem muscle metabolism

17 Abnormal postmortem muscle metabolism

19 Postmortem proteolysis and the resolution of rigor (aging)

24 Ionic strength and the resolution of rigor

26 β -Adrenergic agonists, breed type, and the aging of meat

31 **MIDTERM III (Conversion of Muscle to Meat)**

SECTION IV. GROWTH, DEVELOPMENT, AND INNERVATION OF MUSCLE

November

- 2 Embryonic growth and myogenesis
- 7 Satellite cells and muscle repair and growth
- 9 Primary, secondary, and tertiary myotubes during muscle development
- 14 Plasticity of muscle fibers: polyneuronal innervation
- 16 Innervation, denervation, and development of muscle
- 21 **MIDTERM IV (Innervation and Development of Muscle)**
- 23 **Reading day, no classes. Happy Thanksgiving!**

SECTION V. MARBLING AND MEAT

- 28 Conversion of muscle satellite cells to marbling adipocytes
- 30 Contribution of marbling to healthfulness of beef

December

- 5 Redefined day. Students attend their Friday classes.
- 7 Last day of classes. Muscle as food
- 13 **FINAL EXAMINATION (10:30 – 12:30) (20% new material; 80% review)**