

## Agricultural Science 375: Equine Exercise Physiology

MW 2:30-3:20 pm, Th 1:30-3:20 pm, Spring 2007

Instructor: Dr. Charlie Apter  
Office: 3084 Magruder Hall  
Phone: 785-4584 (O) or 665-1225 (H)  
Office Hours: TWR 8:30-10:30 am or by appointment  
e-mail: [CApter@truman.edu](mailto:CApter@truman.edu)

**Course Description:** Consideration of the science of exercise physiology as applied to equine, including a comparison of the four athletic species, structural considerations or raw materials of exercise, responses of the equine athlete to exercise and training, and principles of training the equine for various athletic events. Upon completion of the course, each student will have a greater appreciation for the horse as an athlete and for the impressive design which characterizes the equine athlete.

**Textbook:** David Marlin and Kathryn Nankervis. 2002. *Equine Exercise Physiology*. Blackwell Science. Supportive readings from various sources will also be required.

### Lecture Outline (as always, tentative)

- I. Introduction: Horses as athletes
  - Overview of performance and equine sports medicine
    - Marlin and Nankervis, *Introduction* (Chapter 1)
    - Rose and Hodgson, *Overview of performance and sports medicine*, in Hodgson and Rose, 1994
  - Comparative data: horse, human, greyhound, camel
    - Derman and Noakes, *Comparative aspects of exercise physiology*, in Hodgson and Rose, 1994
  - Equine exercise physiology ("sports medicine") vs. the human
    - Budiansky, *Don't bet on faster horses*
    - Rose, *The challenge for equine exercise physiology*
- II. Structural considerations ("The Raw Materials")
  - Energy producing systems
    - Marlin and Nankervis, *Energetics of Exercise* (Chapter 2)
  - Muscular system: Muscle, tendon, ligament
    - Marlin and Nankervis, *Muscles* (Chapter 3)
    - Marlin and Nankervis, *Muscular responses* (Chapter 7)
  - Skeletal system: Bone
    - Hildebrand and Goslow, *Structural elements of the body*
    - Marlin and Nankervis, *Connective tissue* (Chapter 4)
    - Marlin and Nankervis, *Skeletal responses* (Chapter 8)
    - Neilsen, *Modifications of skeletal system in young growing horses upon commencement of training*
  - Respiratory system: Lungs
    - Marlin and Nankervis, *The respiratory system* (Chapter 5)
    - Marlin and Nankervis, *Respiratory responses* (Chapter 9)
  - Cardiovascular system: Heart
    - Marlin and Nankervis, *The cardiovascular system* (Chapter 6)
    - Marlin and Nankervis, *Cardiovascular responses* (Chapter 10)
- III. Physiological and biomechanical considerations
  - Aspects of physiological stress and fatigue
    - Marlin and Nankervis, *Aspects of physiological stress and fatigue* (Chapter 11)
  - Thermoregulation
    - Marlin and Nankervis, *Thermoregulation* (Chapter 12)
    - Baptiste et al., *A function for guttural pouches in the horse*
  - Introduction to biomechanics
    - Marlin and Nankervis, *Introduction to biomechanics* (Chapter 13)

#### IV. Applications of Exercise Physiology

- Demands of equestrian sport
  - Marlin and Nankervis, *Demands of equestrian sport* (Chapter 14)
- Training principles
  - Marlin and Nankervis, *Training principles* (Chapter 15)
- Training facilities
  - Marlin and Nankervis, *Training facilities* (Chapter 16)
- Practical training
  - Marlin and Nankervis, *Practical training* (Chapter 17)
- Exercise testing
  - Marlin and Nankervis, *Exercise testing* (Chapter 18)
- Indicators of performance
  - Marlin and Nankervis, *Indicators of performance* (Chapter 19)
- Feeding performance horses
  - Marlin and Nankervis, *Feeding performance horses* (Chapter 20)

**Exams and Grading:** I would like to deemphasize large tests and yet provide incentive to read the assigned readings and to be engaged and participatory. Large amounts of material will be covered in lab.

Quizzes (25 quizzes at 25 points each): .....575 points

Each quiz will consist of 2-4 broad questions which will require short paragraph and/or listing answers, or perhaps the drawing of a figure or graph. At my discretion may be combined together into longer quizzes of greater point values; students can drop lowest two quizzes

Participation and attendance .....50 points

I will take attendance each lecture; we physically meet 25 times and for each of those times you will get a point for being there and a point for participating

Lecture final, Monday, May 3, 2007, 1:30-3:20 pm ..... 0 points

There will be no final exam for the lecture, but we will meet to play Equine Exercise Physiology Jeopardy with prizes awarded; attendance at this event is mandatory; your absence will cost you your participation points for the semester

Lab (quizzes, lab final): .....325 points

10 quizzes each worth 25 points (drop the lowest one) and cumulative laboratory final worth 100 points

Grades will be calculated as a percentage of 950 possible points. Letter grades will be assigned as follows:

- |   |           |
|---|-----------|
| A | 90 - 100% |
| B | 80 - 89%  |
| C | 70 - 79%  |
| D | 60 - 69%  |
| F | Below 60% |

**Academic integrity** (quoted directly from <http://conduct.truman.edu/docs/AcademicIntegrity.pdf>)

The Student Conduct Code (8.020.01) defines the term "academic dishonesty" to include, but not to be limited to, any one of the following acts:

1. CHEATING: Merriam-Webster's Dictionary defines cheating as "to practice fraud or trickery; to violate rules dishonestly (as at cards or on an examination)." In the Student Conduct Code, it is defined as "using or attempting to use unauthorized (a) materials, (b) information, or (c) study aids in any academic exercise."

2. **FABRICATION:** Defined in the Code as "unauthorized (a) falsification or (b) invention of any information (including research data) or citation in an academic exercise."
3. **FACILITATING ACADEMIC DISHONESTY:** Defined in the Code as "(a) assisting or (b) attempting to assist another to commit an act of academic dishonesty, whether or not that action is associated with any particular course."
4. **PLAGIARISM:** This can be a tough one to define and understand. Many students aren't quite sure what is or is not plagiarism. A good rule of thumb: if you feel guilty or uncomfortable doing something, then most likely it is dishonest! Plagiarism is a unique kind of academic dishonesty in which one person steals another person's ideas or words and falsely presents them as his/her own product. In the Student Conduct Code, plagiarism is defined as "representing the words or ideas of another as one's own in any academic exercise. The term 'plagiarism' includes, but is not limited to, (a) the use, by paraphrase or direct quotation, of the published or unpublished work or sections of a work of another person without full and clear acknowledgement; (b) the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials, including material taken from or ordered through the Internet; or (c) unacknowledged use of original work/material that has been produced through collaboration with others without release in writing from collaborators."
5. **SABOTAGE:** Defined in the Code "as, but is not limited to, the unauthorized interference with, modification of, or destruction of the work or intellectual property of another member of the University community."

**Consequences for academic misconduct include:**

1. Punitive grading such as receiving an "F" on the assignment or in the class.
2. Being reported to the Division Head, the Vice President for Academic Affairs, and the Dean of Student Affairs.
3. University Conduct action for violating the Student Conduct Code.
4. Being suspended or expelled from the major or division by the Division Head.
5. Being suspended or expelled from the University as a sanction for violating the Student Conduct Code.

### AGSC 375 Lab Schedule (as always, tentative)

<b>Date</b>	<b>Subject</b>	<b>Location</b>
January 18	Overview of equine athletic competitions	MG 2026
January 25	Review of the skeletal system and joints	MG 2026
February 1	Muscles of thorax and neck that support exercise 25 point quiz over skeletal system and joints	MG 2026
February 8	Muscles of thoracic and pelvic limbs 25 point quiz over muscles of thorax and neck	MG 2026
February 15	Anatomy and function of the heart and lung (dissection) 25 point quiz over muscles of thoracic and pelvic limbs	MG 2026
February 22	Anatomy of the foot and leg I (dissection) 50 point quiz over heart and lung	MG 2026
March 1	Anatomy of the foot and leg II (dissection) 25 point quiz over anatomy of foot and leg I	MG 2026
March 8	<u>NO LAB</u> : Midterm Break	
March 15	Hoof trimming and shoeing demonstration 25 point quiz over anatomy of foot and leg II	University Farm
March 22	Walk, trot, canter, gallop movies 25 point quiz over hoof trimming and shoeing	MG 2026
March 29	Gaits and gait analysis 25 point quiz over foot fall patterns and sequences	University Farm
April 5	No lab – Easter break	
April 12	Heart and respiration rate responses to exercise 25 point quiz over gaits and gait analysis	University Farm
April 19	Overflow for weather issues	
April 26	Cumulative lab final (100 points)	MG 2026