

**Syllabus for
Techniques in Equine Exercise Physiology
Fall and Spring Semesters (3 Credits)**

Objective, overview, and background: The major goal of this class is to provide opportunities for students to learn about the application of the scientific method and hypothesis driven research with real time experiences. Each semester 15-20 students enroll in Research in Animal Science to assist in research projects conducted in the treadmill laboratory where they are trained in a variety of research techniques as well as trained to effectively prepare, refresh, and assist with horses to be tested in a variety of experiments. In Techniques in Equine Exercise Physiology (11:067:403) those experiential learning opportunities are supplemented with focused formal classroom sessions that utilize a small group learning format and a Socratic style exchange between students and the instructor. The primary goal of the course is to use the studies conducted in the lab as a real time method to teach about the scientific method, sound scientific practices, and the physiological responses to exercise. The class is offered for **3 credits** based on a the above mentioned classrooms session and participation in approximately 40-50 research hours.

- **Learning Objective 1:** Students will be refreshed in general laboratory safety for the treadmill lab as well as a review of the chemical hygiene training provided by REHS.
- **Learning Objective 2:** Students will learn safe horse handling with a focus on the behavior of horses, principals of behavior modification, and how those principals apply to the preparation of horses for use in the treadmill laboratory.
- **Learning Objective 3:** Students will learn the about the scientific method and its application to hypothesis driven research. Those principals will be discussed in detail better understand *a priori* experiment design and the proper use of statistical analysis.
- **Learning Objective 4:** Students will learn the theory regarding calibration of equipment, proper controls and general good laboratory practices practices including those needed to operate equipment (e.g., treadmill, open flow calorimeter, hemodynamic recording system, etc.) used to make physiological measurements.
- **Learning Objective 5:** Students will learn, then assist in, and eventually conduct a variety of procedures including but are not limited to sterile preparation, catheterization, blood collection and processing of blood and plasma samples for later analysis.
- **Learning Objective 6:** Students will learn the theory and will assist in conducting a variety of routine assays related to exercise trials (eg. measurement of packed cell volume, total plasma protein concentration, plasma lactate concentration, etc.) when opportune and appropriate.
- **Learning Objective 7:** Students will learn the theory and, when appropriate and opportune, assist in conducting more complex techniques and assays. Techniques may include:
 - Techniques related to the measurement of gas exchange and indirect calorimetry.
 - Techniques related to body composition assessment via body condition scoring as well as use of ultrasonographic methods to estimate percent body fat and calculation of fat free mass.
 - Techniques related to the assessment of thermoregulation.
 - Techniques related to the measurement of plasma and blood volume.
 - Techniques for collecting blood for the measurement of hematology and blood chemistry.
 - Techniques for the measurement of cardiovascular and other physiological parameters using transducers and recording systems

Evaluation: Students are evaluated as follows: Attendance and participation in the lab (25 points); participation in a biweekly journal club style recitation. (25 pts); laboratory journal and notes taken during class (25 pts); term paper or project (25 pts); total (100 pts). Grading: A = 90 - 100; B = 80 - 89; C = 70 - 79; D = 60 - 69; F = 0 - 59.