

# Course Outline Form: Winter 2018

## General Information

**Course Title:** EQN\*3150 Equine Exercise Physiology

### **Course Description:**

This course is an additional laboratory component to complement EQN\*3050. Lab exercises focus on the practical application of theoretical knowledge to develop an understanding for the basic physiological principles of muscle contraction and fatigue, thermoregulation, energy utilization under differing exercise intensities, and how these principles can be applied to differential training strategies for equine athletes.

**Credit Weight:** 0.50

**Academic Department (or campus):** Department of Animal Biosciences

**Campus:** Guelph

**Semester Offering:** W2018

**Class Schedule and Location:** TBA

## Instructor Information

Instructor Name: Dr. Wendy Pearson  
Instructor Email: wpearson@uoguelph.ca  
Office hours: by appointment

## GTA Information

GTA Name: Ms. Ashley Nixon  
GTA Email: anixon01@uoguelph.ca  
GTA office hours: by appointment

## Course Content

### **Specific Learning Outcomes:**

*Upon completion of this course, students should/will:*

1. understand and explain basic principles of muscle contraction and relaxation within a context of energetic inputs and differential training regimens
2. define fundamental principles of energy demand, energy supply and energy utilization within muscle

- articulate the integration of major physiological systems, including cardiovascular, respiratory, musculoskeletal and gastrointestinal systems within the context of the equine athlete.

### Lab Content:

Please note that steel-toed safety shoes are required for all students participating in labs involving live horses. Students not wearing appropriate footwear will be asked to leave the lab.

Week #	Date	Activities
1	Jan 8	<i>Course Introduction;</i> <i>Introduction to animal techniques in equine exercise physiology:</i> safety around horses; weigh bridge vs weight tape; taking a rectal body temperature; installing and reading a heart rate monitor; BIA <b>(Lab Report #1 due)</b>
2	Jan 15	<i>Field Trip – First Line Training Centre</i> Exercise horses in an equine swimming pool blood biochemistry, hematology, lactate, heart rate, BIA, rectal temp
3	Jan 22	<i>Field trip – TB farm</i>
4	Jan 29	<i>Journal club #1</i> <b>Assignment #1 due:</b> Musculoskeletal effects of exercising young horses (i.e. <1.5yrs) <b>(Lab Report #2 due)</b>
5	Feb 5	<i>Biomechanics (Video and Data Set)</i> <ul style="list-style-type: none"> <li>Force plate – measure Fz, Fy</li> <li>Gait analysis? <b>(Lab Report #3 due)</b></li> </ul>
6	Feb 12	<i>Respiratory System (Video and Data Set)</i> <a href="https://www.youtube.com/watch?v=20pYGHN95BU">https://www.youtube.com/watch?v=20pYGHN95BU</a> Exercising horses on treadmill vs field; gas collection <ul style="list-style-type: none"> <li>VO<sub>2</sub>, VCO<sub>2</sub>, tidal volume, minute ventilation, fr, Va, Vd <b>(Lab Report #4 due)</b></li> </ul>
	Feb 19	<b>READING WEEK – NO CLASSES</b>
7	Feb 26	<i>Journal club #2</i> <b>Assignment #2 due:</b> Interview Assignments due – cardiovascular disease in athletic horses
8	Mar 5	<b>Assignment #3 due:</b> 15-min presentations on effects of exercise on GIT function
9	Mar 12	<b>Hydration / thermoregulation</b> <ul style="list-style-type: none"> <li>Field trip - rectal temp, BIA measurement on exercising horses <b>(Lab Report #5 due)</b></li> </ul>
10	Mar 19	<i>Field trip – Standardbred training farm (First line Training Centre)</i>
11	Mar 26	<ul style="list-style-type: none"> <li><i>Field Trip – Woodbine racetrack backstretch tour</i> <b>(Lab Report #6 due)</b></li> </ul>

Apr 2	<i>Easter Monday – no class</i>
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**Course Assignments and Tests:**

Assignment or Test	Contribution to Final Mark	Learning Outcomes Assessed
1. Lab Reports	6 @ 7% = 42%	1 - 3
2. Journal club	2 @ 9% = 18%	3
3. Assignment #1	20%	1, 2, 3
4. Assignment #2	10%	1, 3
5. Assignment #3	10%	1, 2, 3

**1. Lab reports**

Lab reports are completed for each lab and are due at the beginning of the subsequent lab. Each lab report is provided in your lab manual and is worth 7% of your final mark.

**2. Journal club**

Students will read the research papers listed below. They will prepare a 200 word lay-summary of each article, that includes the purpose of the study or review, the main findings and the practical implications and/or applications of the findings. Summaries will be due at the beginning of the Journal club lab. During the lab, we will have a critical discussion of each paper, and will identify strengths, limitations and future research questions which are raised by each paper.

*Journal club marks will comprise 30% from summaries  
70% from in-class participation in discussion.*

Reading list for Journal Club #1

Mukai K, Hiraga A, Takahashi T, Matsui A, Ohmura H, Aida H, Jones JH. Effects of maintaining different exercise intensities during detraining on aerobic capacity in Thoroughbreds. *Am J Vet Res.* 2017 Feb;78(2):215-222.

Praud A, Dufour B, Robert C, Valette JP, Denoix JM, Crevier-Denoix N. Effects of management practices as risk factors for juvenile osteochondral conditions in 259 French yearlings. *Vet J.* 2013 Jul;197(1):72-6.

Turley SM, Thambyah A, Riggs CM, Firth EC, Broom ND. Microstructural changes in cartilage and bone related to repetitive overloading in an equine athlete model. *J Anat.* 2014 Jun;224(6):647-58.

Reading list for Journal Club #2

Eliashar E. The biomechanics of the equine foot as it pertains to farriery. Vet Clin North Am Equine Pract. 2012 Aug;28(2):283-91.

Ohmura H, Mukai K, Takahashi T, Aida H, Jones JH. Cardiorespiratory function in Thoroughbreds during locomotion on a treadmill at an incline or decline. Am J Vet Res. 2017 Mar;78(3):340-349.

Frellstedt L, Gosset P, Kervoaze G, Hans A, Desmet C, Pirottin D, Bureau F, Lekeux P, Art T. The innate immune response of equine bronchial epithelial cells is altered by training. Vet Res. 2015 Jan 17; 46:3.

### 3. **Assignment #1**

The assignment is designed to give students an opportunity to integrate knowledge reported in primary research papers. The literature review should be a state-of-the-art scientific review of what is known, *and not known*, about the physiological impact (both good and bad) of exercise training juvenile horses.

Students will prepare a detailed literature review, according to the instructions below.

**PLEASE FOLLOW INSTRUCTIONS CAREFULLY.**

- ✓ A minimum of 6 peer reviewed scientific research papers
  - Scientific review papers and text books may be used as resources but cannot be counted in your 6 research papers
- ✓ Proper referencing using the Equine Veterinary Journal style
- ✓ 6 pages (DO NOT EXCEED MAXIMUM PAGE LENGTH), 11 pt. times new roman font
  - Diagrams, tables and references can be in addition to the page count.
- ✓ **Subheadings must be used** to organize your paper, and format should follow that of a published review paper

#### **Rubric for Literature Review**

##### **Title and Abstract (20/100)**

Briefly states the purpose, why this area of research is important, and the key points that the review makes.

##### **Introduction (20/100)**

The introduction should get the reader's attention, introduce the main idea of the report, *and end with a strong thesis statement.*

##### **Body (50/100)**

- Use Headings / Subheadings to help organize the flow of topics and information
- Paragraphs should begin with a clear topic sentence, which contains an important idea about your research topic. Supporting, detailed sentences should follow the topic sentence. The paragraph should end with a strong summary statement.
- Paragraphs should be arranged in the best possible order.
- Each section should end with a brief summary paragraph.
- Points to consider:

- Are the topics stated in the thesis statement appropriately addressed in the report?
- Did the student stay focused on the main topic and sub topics?
- Are details used to explain and clarify the main issue/topic?
- Is the information, presented by the student, appropriate?
- Did the student adequately integrate research results?
- Did the students provide sufficient research data to reach a clear conclusion regarding the topic?
- Spelling checked? Punctuation checked? Capitalization checked? Grammar and usage checked?

### **Conclusions (5/100)**

The conclusion repeats the main part of the report and ends with a final, interesting sentence. The thesis statement is often restated here. Conclusion should not introduce any new references.

### **References (5/100)**

Format references using the style of the Equine Veterinary Journal

See: [http://onlinelibrary.wiley.com/journal/10.1001/\(ISSN\)2042-3306/homepage/ForAuthors.html](http://onlinelibrary.wiley.com/journal/10.1001/(ISSN)2042-3306/homepage/ForAuthors.html)

## **4. Assignment #2**

The purpose of this assignment is to allow students to interact directly with professional members of the equine community, and to develop an understanding of the impact of cardiovascular dysfunction or disease in performance horses. For this assignment, students will work in groups of 3- 4 students. Each group will be required to interview 3 professional persons who are actively engaged in the care and/or training of *competitive* athletic horses (e.g. racing standardbreds, racing thoroughbreds, competitive sport-horses, competitive trail horses, etc.). The interviewees may be veterinarians, researchers, trainers, or any other professionals engaged in equine sport. Each group will create a list of *at least* 12 questions for their interviewee, which are targeted towards understanding the incidence and impact of cardiovascular disease in horses. Questions must be reviewed and approved by your instructor prior to each interview. Group reports must include the names of all members, a summary of responses of each interviewee to each question, and a 1-page discussion of the groups' findings on the incidence and impact of cardiovascular disease, as well as types of cardiovascular conditions most often observed in competitive horses.

## **2. Assignment #3 - Presentations**

The purpose of this assignment is to give students the opportunity to explore and integrate primary literature pertaining to the impact of exercise on gastrointestinal function, and to articulate their findings in a scientific-style presentation. Students will work in group of 3-4 students, and will prepare a 15-minute scientific presentation on the

impact of exercise on nutrient requirements, digestibility of feedstuffs, hormonal regulation of transit time and any other important impacts. Presentation style should follow that of a scientific presentation, and should include:

Title slide

- Title of talk
- all group members' names

Outline slide

- provide an outline of the major topics to be covered

Content slides

- be sure to include citations for research papers (LastName et al. XXXX)

Summary slide

- highlight the main points in your content slides

Take-home message slide

- one statement which summarizes the practical implications of your findings on the effect of exercise on gastrointestinal function

References slide

- list of all scientific papers used in your content slides (should include at least 10)

Presentations should be prepared on PowerPoint, and must be 15 minutes, plus 5 minutes for questions. It is not necessary that all students in the group participate in the presentation of the slides, but all students in the group must contribute equally to the overall effort.

<b>GRADING SCHEME FOR ASSIGNMENTS</b>				
<b>Performance Element</b>	<b>Distinguished 90-100 Points</b>	<b>Proficient 80-90 Points</b>	<b>Intermediate 60-80 Points</b>	<b>Novice 0-60 Points</b>
<b>Purpose and Focus</b>	Establishes and maintains clear focus; writer's central purpose or argument is readily apparent to the reader.	Writing has a clear purpose or argument, but may sometimes digress from it.	Central purpose or argument not consistently clear throughout paper.	Limited awareness of audience and/or purpose; The purpose or argument is generally unclear.
<b>Content and Development of Ideas</b>	Depth and complexity of ideas supported by pertinent details; evidence of analysis, reflection and insight.	Depth of idea development supported by elaborated, relevant details.	Unelaborated idea development; unelaborated and/or	Minimal idea development, limited and/or unrelated details. Central purpose or argument

**GRADING SCHEME FOR ASSIGNMENTS**

<b>Performance Element</b>	<b>Distinguished 90-100 Points</b>	<b>Proficient 80-90 Points</b>	<b>Intermediate 60-80 Points</b>	<b>Novice 0-60 Points</b>
	Balanced presentation of relevant and legitimate information that clearly supports a central purpose or argument and shows a thoughtful, in-depth analysis of a significant topic. Reader gains important insights.	Information provides reasonable support for a central purpose or argument and displays evidence of a basic analysis of a significant topic. Reader gains some insights.	repetitious details. Information supports a central purpose or argument at times. Analysis is basic or general. Reader gains few insights.	is not clearly identified. Analysis is vague or not evident. Reader is confused or may be misinformed.
<b>References</b>	References are primarily peer reviewed professional journals or other approved sources (e.g., government documents, agency manuals, ...). The reader is confident that the information and ideas can be trusted.	Although most of the references are professionally legitimate, a few are questionable (e.g., trade books, internet sources, popular magazines, ...). The reader is uncertain of the reliability of some of the sources.	Most of the references are from sources that are not peer reviewed and have uncertain reliability. The reader doubts the accuracy of much of the material presented.	There are virtually no sources that are professionally reliable. The reader seriously doubts the value of the material and stops reading.
<b>Organization</b>	The ideas are arranged logically to support the purpose or argument. They flow smoothly from one to another and are clearly linked to each other. The reader can follow the line of reasoning.	ideas are arranged logically to support central purpose or argument. For the most part, the reader can follow the line of reasoning.	In general, writing is arranged logically, though occasionally ideas fail to make sense. Reader is fairly clear about what writer intends.	Random or weak organization. The writing is not logically organized. Frequently, ideas fail to make sense together. The reader cannot identify a line of reasoning and loses interest.
<b>Sentence Structure</b>	Controlled and varied sentence structure	Variety of sentence structure and length	Simplistic and/or awkward sentence structure	Incorrect or lack of topic and/or ineffective wording and/or sentence structure

<b>GRADING SCHEME FOR ASSIGNMENTS</b>				
<b>Performance Element</b>	<b>Distinguished 90-100 Points</b>	<b>Proficient 80-90 Points</b>	<b>Intermediate 60-80 Points</b>	<b>Novice 0-60 Points</b>
<b>Language</b>	Precise and/or rich language	Acceptable, effective language	Simplistic and/or imprecise language	Incorrect and/or ineffective wording and/or sentence structure
<b>Grammar and Formatting</b>	Control of surface features	Few errors in grammar or format relative to length and complexity	Some errors in grammar and/or format that do not interfere with communication	Errors in grammar and format (e.g., spelling, punctuation, capitalization, etc.)

**Final examination date and time:** No final exam

**Final exam weighting:** 0% of mark.

### **Course Resources**

#### **Required Texts:**

Equine Exercise Physiology: The Science of Exercise in the Athletic Horse.

Author(s): Kenneth W. Hinchcliff, BVSc(Hons) MS PhD Dip ACVIM, Raymond J. Geor, BVSc MVSc PhD Dipl ACVIM, and Andris J. Kaneps, DVM PhD Dip ACVS. ISBN: 978-0-7020-2857-1. PDF version available at University library.

#### **Recommended Texts:**

1. Anatomy and Physiology of Farm Animals (Frandsen) (e-version available through UofG Library)

#### **Field Trips:**

Thoroughbred Training Farm  
Standardbred Training Farm  
Woodbine Racetrack

#### **Additional Costs:**

Steel-toed safety shoes are required for this course. Students not wearing appropriate footwear during labs involving horses will be asked to leave the lab; missed marks are the responsibility of the student and no make-up assignments will be offered.

## **Course Policies**

### **Grading Policies:**

Alternate assessments will be offered only to students with documented medical, psychological, or compassionate reasons for missing a scheduled assessment. An Academic Consideration form must be submitted to the instructor. Go to <https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac-ac.shtml> for information on regulations and procedures related to Academic Consideration. Late assignments, if applicable, will be penalized at 10% per day late, commencing the day following the published due date, and will only be accepted for a maximum of 3 days following the published due date.

### **Course Policy regarding use of electronic devices and recording of labs:**

The general use of small, personal electronic devices (e.g. cell phones, iPods) during class is disruptive and disrespectful. As a result, their use in the lab for reasons other than instructor-led learning is prohibited.

## **University Policies**

### **Academic Consideration:**

The University of Guelph is committed to supporting students in their learning experiences and responding to their individual needs and is aware that a variety of situations or events beyond the student's control may affect academic performance. Support is provided to accommodate academic needs in the face of personal difficulties or unforeseen events in the form of Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions, including categories, grounds, timelines and appeals can be found in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

### **Academic Misconduct:**

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before

submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Detailed information regarding the Academic Misconduct policy is available in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

### **Accessibility:**

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email [sas@uoguelph.ca](mailto:sas@uoguelph.ca) or visit the [Student Accessibility Services website \(http://www.uoguelph.ca/csd/\)](http://www.uoguelph.ca/csd/).

### **Course Evaluation Information:**

End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery. While many course evaluations are conducted in class others are now conducted online. Please refer to the [Course and Instructor Evaluation Website](#) for more information.

### **Drop period:**

The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in [Section III \(Schedule of Dates\) of the Undergraduate Calendar](#).

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

### **Additional Course Information**

In the classroom, students are expected to demonstrate behaviour that would meet the minimum conduct requirements of any professional working environment. This includes

appropriate use of language and non-verbal communication.

Keep paper and/or other reliable back-up copies of all out-of-class assignments- you may be asked to resubmit work at any time.

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the written permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

**Electronic Communications:**

It is the student's responsibility to ensure that he/she knows how to send and receive e-mail using his/her *GryphMail* account and to check it regularly. All course-related electronic communications with the instructor and fellow students are to be delivered with the *GryphMail* account. Courselink will be used as our method to relay information and content related to the course. The course website on Courselink should be consulted daily for general information, lecture content, announcements, marks and study resources. We will use the News section to provide clarification, additional instructions and information regarding the current activities in the course. PDF versions of lectures will be available prior to each lecture under Content tab.