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## BIOL 191 – The physiology of movement

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### Instructor

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Office hours: Open zoom meeting M, W 10-11.20am, or by appointment. Email me!

### Learning Outcomes

This course will cover physiology of the musculoskeletal and sensorimotor systems. It goes from first principles to application, and emphasizes a quantitative, integrative approach to biology that is grounded in the primary literature. By the end of this course, students will:

1. Have a quantitative understanding of the physiology of the components of the musculoskeletal and nervous systems that contribute to movement.
2. Be able to integrate their understanding of these components to explain how they can collectively result in stable locomotion.
3. Discuss the ontogeny and ageing of the components of the musculoskeletal and sensorimotor systems, and their effects on locomotion.
4. Evaluate and use primary literature as a source of basic information.
5. Use this primary literature to produce a written synthesis of a locomotor pathology.

### Readings

#### **Not required, but helpful sources:**

Silverthorn DU. 2016. *Human Physiology: An Integrated Approach*, 7e. Pearson, Boston, MA. ISBN 978-0134-70434-0

Enoka, R.M. (2015) *Neuromechanics of human movement*. Human Kinetics. 5<sup>th</sup> Edition

Biewener, A.A. and Patek, S. (2018) *Animal locomotion*. 2<sup>nd</sup> Edition. Oxford University Press

Scanned chapters will be provided – email if there's anything you're particularly struggling with and I'll direct you to a good online resource.

PDFs of all required primary literature will be provided

### Grading

Participation	10%
Problem set completion	15%
Midterm	20%
Final exam	25%
Research Paper draft completion	5%
Research Paper	25%

≥90% is guaranteed at least an A-, ≥80% at least a B-, and ≥70% at least a C-. The grade cutoffs might fall below these levels but will not be raised above them.

## **Participation**

Demonstrate to me that you are engaging with class. Show up to discussion sessions with something to say, or arrange an alternate meeting with me. Come to virtual office hours. Email me when you have questions. Turn in notes on assigned readings (these can be in any format, just show me the notes you took as you were reading the paper). Meet with me to discuss your research paper.

## **Problem sets**

Problem sets are due **Sunday at midnight** in the weeks specified in the schedule. They will be composed of calculations and short answer questions. Problem sets will be graded only on turning in a clear attempt at each question. Feel free to work together and help each other. Video answers will be provided the following week and discussion sessions/ office hours will be used for additional support.

## **Mid-term**

The mid-term will cover material up to and including week 4. It will be composed of 5 multi-part questions similar in content and identical in style to the problem sets. This exam will be entirely open book but is to be completed independently. We will discuss the details of how best to administer this during the quarter.

## **Final**

The final will cover material from weeks 6-10 inclusive. It will be composed of 5 multi-part questions similar in content and identical in style to the problem sets. This exam will be entirely open book but is to be completed independently. We will discuss the details of how best to administer this during the quarter.

## **Research paper**

Generate an original research paper on a locomotor condition. Give a brief description of the condition. Outline the relevant healthy physiology (use lecture notes, textbooks, and primary research papers covered in class) and how this is altered in this condition (use primary research papers covered in class and independently sourced primary research papers). Demonstrate how an understanding of this physiology has been used to design and improve treatments for this condition (use independently sourced primary research papers). Evaluate the effectiveness of these treatments and/ or suggest alternate treatment targets based on your understanding of the underlying physiology.

This paper should be 4-6 pages long (1.5 line spaced, 1 inch margins) and should cite at least 10 primary sources, including a minimum of 5 that have been found independently (i.e. not covered in lectures or discussion sessions).

This assessment method is designed to help you move towards greater intellectual independence. It is a large project worth a significant proportion of your grade, but there are lots of opportunities to get help and feedback. We will talk about the paper in discussion sessions. Think about this assignment, collect and read papers on your chosen topic, and discuss ideas with me throughout the quarter. Do not leave it until the last minute! A draft is due in week 8 and

comprehensive feedback will be provided. The more complete this draft, the more helpful the feedback will be.

Requests for re-grades will be accepted for one week after exams are returned. To have your exam re-graded, you must submit your concerns in writing, along with your copy of the exam.

### **Turning in work**

Unless otherwise noted, all work will be submitted through ilearn/ blackboard. Work is due by midnight on the day listed in the schedule.

### **Expected Workload**

According to university policy, for a 4-credit course such as BIOL191, students are expected to perform at least 8 hours of class-related work per week outside of class.

### **Learning Assistance**

Students are strongly encouraged to contact the professors whenever they need assistance, whether it be to clarify a point, review course requirements, discuss grading, or for any another matter. No issue of concern is too large or too small, and no question is stupid. Students are also encouraged to avail themselves of support services offered by UCR's Academic Resource Center, <http://arc.ucr.edu/>, (951) 827-3721.

### **Disability or Other Accommodations**

If you would like to request academic accommodations due to a disability or other condition, please contact Student Special Services, (951) 827-3861, [specserv@ucr.edu](mailto:specserv@ucr.edu) and inform us of your needs as soon as possible – ideally, prior to the first assignment due date. If you have any other needs, please inform me as soon as possible.

### **Mental Health & Wellness**

As a student, you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, depression, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. UC offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know is suffering from any of the aforementioned conditions, consider utilizing the confidential mental health services available on campus. We encourage you to reach out to the Counseling Center for support ([counseling.ucr.edu](http://counseling.ucr.edu), 951-827-5531). An on-campus counselor or after-hours clinician is available 24/7.

### **Emergency and Disaster Preparedness**

In the event of a disaster or other emergency during class, remain in the classroom (to the extent possible) and listen for official announcements about what to do. For more information, go to <http://ehs.ucr.edu/services/emergency.html>.

### **UCR Policies**

Students are responsible for reviewing and complying with all UCR policies (<http://conduct.ucr.edu/Pages/default.aspx>).