Biological Clocks (Psych C113/Bio C143A)
Fall 2020 – Tues/Thurs 1:00PM-2:00PM PST Online

Instructor:
Dr. Lance Kriegsfeld (kriegsfeld@berkeley.edu)
Office Hours: Fri 1:30-2:30 and by appointment
Office Hours – To be held online

Graduate Student Instructor:
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Office Hours: Tues 2:00-3:00
Office Hours – To be held online

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Office Hours: Tues 2:30-3:30
Office Hours – To be held online

Berkeley Honor Code: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others." Please observe the Berkeley Honor Code.

Required Readings: Readings will come from the primary literature as well as review articles. Reading for each week will be provided on bCourses. I strongly encourage you to keep up with the readings. If you do not have significant experience reading primary research articles in the biological/neurosciences, the readings will be challenging at first. The most effective learning strategy is to read the articles before class and listen and participate in class discussions. I can assure you that if you take the readings seriously, you will make extraordinary improvements in reading and understanding primary scientific literature by the end of the class. Because this type of reading is likely different than other classes you have taken, I strongly encourage you to use the Discussion section, my office hours, and those of the GSIs to clarify material each week.

Course Description: This course provides a broad overview of topics in biological rhythms. The general goal of the course is not only to familiarize students with rhythms in physiology and behavior, but also to use biological rhythms as a means of learning about experimental tools in neurobiology. As a result, this course combines reading reviews of topics in the field as well as primary empirical literature. Students will learn how to think critically about scientific questions by reading primary literature and through class participation. Because an important part of learning to think critically is accomplished by engaging in thoughtful discussions on relevant literature and questions in the field, students are expected to actively participate in discussions led by the instructor.

Student participation: While I do not like to make students uncomfortable by calling on them in class, I do like students to read material before class to maximize understanding and learning. I might call randomly on you to describe a finding in a paper or clarify a concept based on your reading. I know this can be intimidating, but I believe it is an important part of the learning experience.

Class Format: Classes will be held online and synchronously. To accommodate students that are in different time zones, classes will be recorded. I highly encourage you to attend class 'live' if possible. This will allow you to ask questions and clarify material. I will allow private chat to me during class to ask questions anonymously. I will also use the Zoom polling feature to gauge class understanding and clarify difficult material if necessary.

Grades: Because it takes a little bit of time to acclimate to reading, understanding and intellectually synthesizing information from primary literature, I have designed grades to be based on three examinations with the first exam worth considerably less that the last two. The first exam will be worth 25%, the midterm and final will each be worth 35%. The remaining 5% of your grade will be based on an assignment. This will be explained further in class, but you will be asked to find a popular press article about a scientific discovery and then find the empirical paper on which the press article is based. The assignment will be to describe how the findings are presented in the popular press and how the findings in the research paper are in line with and/or inconsistent with how the press version outlined the results and their implications.

Exams will be multiple choice and free-answer questions. If you miss the first or second exam for an unacceptable reason, your remaining two exams will be worth 47.5% each (e.g., if you miss the midterm, the first and final exams will each be worth 47.5%). The final will not be cumulative and cannot be missed. I encourage you not to miss exams as it will be very stressful to have almost 50% of your grade based on one test. Letter grades will not be based on a curve. Cheating on a test in any form will result in a grade of 'F' for the class.

Class	Date(s)	Topic
Week 1	8/27	Class Introduction
Week 2	9/1	Intro to Biological Rhythms
	9/3	Intro to Biological Rhythms
Week 3	9/8	Adaptive Significance of Timekeeping
	9/10	Adaptive Significance of Timekeeping
Week 4	9/15	Lesions/Transplant techniques
	9/17	The Master Brain Clock
Week 5	9/22	The Master Brain Clock
	9/24	Annual Rhythms
Week 6	9/29	Annual Rhythms
	10/1	**Exam I**
Week 7	10/6	Histological Tools
	10/8	SCN Functional Compartments

Week 8	10/13	Master Clock Organization
	10/15	Entrainment (Retinal)
Week 9	10/20	Entrainment (Non-photic)
	10/22	Entrainment (Conclusions)
Week 10	10/27	Tools in Molecular Biology
	10/29	Molecular timing
Week 11	11/3	No Class – General Election Day
	11/5	Molecular timing
Week 12	**11/10**	**Exam II**
	11/12	Neuroendocrine Rhythms
Week 13	11/17	Neuroendocrine Rhythms
	11/19	Peripheral Rhythms (**and assignment due**)
Week 14	11/24	Human relevance of timing (sleep/shiftwork)
	11/26	*Thanksgiving*
Week 15	12/1	Rhythms and Health
	12/3	Rhythms and Health

Final Exam - Fri, Dec 18, 8:00AM - 11:00AM

Readings (will be discussed on the week indicated)

Week 1:
Class Introduction

Week 2:
Platt, 1964
Kuhlman et al., 2007

Week 3:
Ouwang et al., 1998
Froy et al., 2003
DeCoursey et al., 2000

Week 4:
Stephan and Zucker, 1972
Moore and Eichler, 1972

Week 5:
Prosser and Gillette, 1989
Lehrman et al., 1987
Paul et al., 2008
Carter and Goldman,1983

Week 6:
Maywood et al., 1996
Jarjisian et al., 2013

Week 7:
Welsh et al., 2010
Kriegsfeld et al., 2004

Week 8:
Lee et al., 2015
Guler et al., 2007
Berson et al., 2002

Week 9:
Jones et al., 2014
Sack et al., 2000
Stephan et al., 1979

Week 10:
Mohawk et al., 2012
Welsh et al., 1995
Ralph et al., 1988

Week 11:
O'Neill and Reddy, 2012

Week 12:
Kriegsfeld & Silver, 2005
Fitzgerald and Zucker, 1976
Meyer-Bernstein et al., 1999

Week 13:
Cheng et al., 2002
Hastings et al., 2003
Yamazaki et al., 2003
Terazono et al., 2003

Week 14:
Munch et al., 2007
Deboer et al., 2016

Week 15:
Foster et al., 2013
Chang et al., 2015
Levi et al., 2002
Van Dycke et al., 2015