

Biological Clocks (Psych C113/Bio C143A)
Fall 2023 – Mon/Wed 2:00PM-3:00PM in 2060 VLSB

Instructor:

Dr. Lance Kriegsfeld (kriegsfeld@berkeley.edu)
Office Hours: Fri 1:30-2:30 and by appointment
Office Hours – Mondays 3:00-4:00PM in GL-71 Koshland Hall

Graduate Student Instructor:

Jacob Moeller (jmoeller@berkeley.edu)
Office Hours: Thursday, 11:00AM-12:00PM in 8- Koshland Hall

Yaqi Ji (yaqi_ji@berkeley.edu)
Office Hours: Wednesday 1:00-2:00, location TBD

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 in person and will not be recorded.

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 than 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 participation in class and Discussion sections.

Exams will be multiple choice and free-answer questions. If you miss the first or second exam for a legitimate reason with documentation, 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 must be taken. If you miss the first or second exam without a legitimate reason, you will receive a 0% for that test. I encourage you not to miss exams as it will be very stressful to have almost 47.5% 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.

<u>Class</u>	<u>Date(s)</u>	<u>Topic</u>
Week 1	8/23	Class Introduction
Week 2	8/28	Intro to Biological Rhythms (Kulman and web site below) https://ccb.ucsd.edu/the-bioclock-studio/education-resources/basics/index.html
	8/30	Intro to Biological Rhythms (Kuhlman/Lecture)
Week 3	9/4	Labor Day – No class
	9/6	Adaptive Significance of Timekeeping (Ouyang/Froy)
Week 4	9/11	Lesions/Transplants (Lecture/DeCoursey)
	9/13	Adaptive Significance of Timekeeping (DeCoursey)
Week 5	9/18	The Master Brain Clock (Moore/Stephan)
	9/20	The Master Brain Clock (Lehman/Prosser)
Week 6	9/25	Annual Rhythms (Paul/Carter)
	9/27	Annual Rhythms (Maywood)
Week 7	10/2	Exam I
	10/4	Histological Tools (Lecture)
Week 8	10/9	SCN Functional Compartments (Welsh/Kriegsfeld)
	10/11	SCN Functional Compartments (Lee)
Week 9	10/16	Entrainment (Guler/Berson)
	10/18	Entrainment (Stephan/Sack)
Week 10	10/23	Entrainment (Jones)/Tools in Molecular Biology (Lecture)

	10/25	Molecular timing (Mohawk/Welsh)
Week 11	10/30 11/1	Molecular timing (Ralph) Exam II
Week 12	11/6 11/8	Neuroendocrine Rhythms (Kriegsfeld/Fitzgerald) Neuroendocrine Rhythms (Meyer-Bernstein/Cheng)
Week 13	11/13 11/15	Peripheral Rhythms (Hastings/Yamazaki) Peripheral Rhythms (Terazono)
Week 14	11/20 11/22	Human relevance of timing (sleep/shiftwork)(Chang/Levi) <i>Thanksgiving</i>
Week 15	11/27 11/29	Rhythms and Health (Van Dycke) Rhythms and Health (TBD)

Final Exam – Thurs Dec 14, 3:00 – 5:00PM

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