**MCB 186 Spring 2020 (cross-listed HST.516)**
**Wednesdays 3:00-5:45 PM & one 75-minute section to be arranged**
**Room: Biolabs 1080, Biological Laboratories, 16 Divinity Ave, Cambridge**

**STAFF:**

**Head Instructors:**
Prof. Charles A. Czeisler, Neuroscience, HMS, 221 Longwood Ave., Rm. 438A , czeisler@g.harvard.edu

Prof. Frank A.J.L. Scheer, Medicine, HMS, 221 Longwood Ave., Rm. 036 fscheer@g.harvard.edu

**TFs:**
Dr. Melissa A. St. Hilaire, Medicine, HMS, 221 Longwood Ave. Rm. 488 msthilaire@g.harvard.edu (Head TF)
Dr. Shadab A. Rahman, Medicine, HMS, 221 Longwood Ave. Rm. 483 sarahman@g.harvard.edu

**REQUIREMENTS and GRADING:**
This class has no prerequisites. Class and section attendance and participation [20%], original report critique in section [10%], problem sets [10%], project mini-assignments [10%], project presentation in class [5%], written project proposal [15%], and 2 take home exams [15% each].

**Participation:**
Participation is an important component of this course. You are expected to attend all lectures. PollEverywhere questions will be used throughout each lecture to track attendance. All lectures will be recorded; if you are unable to attend lecture, you will be expected to watch the lecture and submit a one-paragraph summary of the lecture material by email to your TF within 1 week of the date of the missed lecture. You are also expected to attend all sections. Section attendance will be recorded by your TF. Section participation grade will be determined based on attendance and participation. If you cannot attend your primary section then arrangement should be made to attend another section that week. If you cannot attend any section on a given week then you must submit a one-page critique of an original report assigned by your TF.

**Original Report Critique:**
Readings will be assigned each week. You are expected to read these assignments; material from these readings will be incorporated into problem set and take home exam questions as well as into PollEverywhere attendance questions. You will also be assigned to a group of up to 5 students within your section, and will be asked to present a critique of one of the weekâ€™s readings in section (week of Mar 2, or week of Mar 30).

**Problem sets:**
Three problem sets will be assigned during the semester (due on Feb 19, Feb 26, and Mar 4). Problem set questions will be reviewed in section prior to their deadlines.

**Take home exams:**
There will be two take home exams during the semester (Mar 11-13 and Apr 15-17). You will have 48 hours to complete the exam and submit via Canvas. Any resources can be used to complete the questions on the exam, but you are not allowed to collaborate with other students.

**Final project:**
During the semester, you will be asked to formulate a hypothesis related to the course material and your own interests and design an experiment to answer this hypothesis. You will be assigned three project mini-assignments throughout the semester to help you research your chosen topic and design your experiment. At the end of the semester, you will present your experiment to the class. You will submit a final report that includes the relevant background related to your topic, the methods and materials to conduct your experiment, the expected results, and the significance.

**DEDICATION:**
This course is dedicated to the memory of Professor J. Woodland Hastings (March 24, 1927 â€“ August 6, 2014) https://www.mcb.harvard.edu/mcb/news/news-detail/3750/in-memoriam-the-glowing-career-of-woody-hastings/

http://en.wikipedia.org/wiki/John_Woodland_Hastings
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**MCB 186 LECTURE SCHEDULE Spring 2020**

Jan 29 Introduction to circadian rhythms [CAC]
Introduction to sleep [FAS]

Feb 5 Discovering the molecular circadian clock [Michael Rosbash, 2017 Nobel Laureate]

Feb 12 Mammalian circadian timekeeping: molecules and networks of the brain [John Abel, MIT]
Properties of circadian clocks, assessing circadian phase and amplitude in humans [CAC]

Feb 19 Properties of circadian clocks, assessing circadian phase and amplitude in humans [CAC]

Feb 26 Photic resetting in humans [CAC]

Discovery of mammalian photoreceptors for circadian entrainment [Michael Do, HMS]

Mar 4 Circadian period in humans: entrainment limits and functional consequences [CAC]

Mar 11 Circadian rhythm disorders [CAC]

Mar 18 No class - spring break

Mar 25 What does it mean to sleep deeply? [Dragana Rogulja, HMS]
Neurobiology and neurochemistry of sleep and sleep disorders [Thomas Scammell, HMS]

***Take-home exam 1 March 25-27*** covers material from Jan 29 to Mar 11

Apr 1 Impact of sleep and circadian disturbances on cardiometabolic function [FAS]

Apr 8 The physiology of melatonin [FAS]

Apr 15 Effects of sleep loss on cognitive performance and memory [Robert Stickgold, HMS]
Immunology and genetics of narcolepsy [Emmanuel Mignot, Stanford]

***Take-home exam 2 April 15-17***

Apr 22 Student oral presentations of proposed experiment

Apr 29 Student oral presentations of proposed experiment

May 6 Final projects due

**REFERENCE BOOKS (no required textbook):**

CHRONOBIOLOGY: Biological Timekeeping, Dunlap, Loros & DeCoursey, Eds. Sinauer 2003

RHYTHMS OF LIFE: The Biological Clocks that Control the Daily Lives of Every Living Thing. Russell Foster & Leon
Kreitzman, Yale, 2005 (semipopular book)

INTRODUCING BIOLOGICAL RHYTHMS Willard L. Koukkari and Robert B. Sothern, Springer 2006

SLEEP: A Very Short Introduction. Steven W. Lockley and Russell G. Foster. Oxford University Press, 2012.

CIRCADIAN RHYTHMS: A Very Short Introduction. R. G. Foster, Leon Kreitzman. Oxford University Press, 2017.

INTERNAL TIME: Chronotypes, Social Jet Lag, and Why You're So Tired. T. Roenneberg. Harvard Univ. Press, 2012.

DANGEROUSLY SLEEPY: Overworked Americans And The Cult Of Manly Wakefulness. Alan Derickson. University
of Pennsylvania Press, 2013.

THE SLEEP REVOLUTION: Transforming Your Life, One Night at a Time. Arianna Huffington. Harmony Books.
2016. (popular book)