**Cellular Neuroscience (NB&B 207) - Winter 2020**

M,W,F 10:30 – 11:50 : 2246 McGaugh Hall

**Instructors –** Ian Parker (course coordinator) iparker@uci.edu, Gyuri Lur, glur@uci.edu, Katumi Sumikawa ksumikaw@uci.edu

**Grading Policy**: Grades will be based on exams and take-home assignments

**Text:** There is no assigned text.Handouts and readings will beassigned during lectures.

Purves et al. "Neuroscience" can be used for introductory material. The 2nd edition is available free at http://www.ncbi.nlm.nih.gov/books/NBK11103/

**Date \_\_\_\_\_\_\_\_\_\_\_\_ Topic \_\_\_\_\_**

***Section #1 Membranes and Ion Channels (I.P.)***

Jan 6 Introduction to electrical concepts

# Jan 8 Passive electrical properties of membranes

# Jan 10 Membrane potential, Nernst, Goldman equations

# Jan 13 Ion channels – electrophysiology, patch clamping

# Jan 15 Ion channels – voltage-gated channels

# Jan 17 Ion channels – ligand-gated channels

# Jan 20 **Martin Luther King Holiday**

 **Grade for section #1 is based on take-home assignments & exam**

***Section #2 Synaptic Transmission (G.L.)***

Jan 22 Action potentials

# Jan 24 The Hodgkin & Huxley Axon

Jan 27 Chemical synapses, quantal transmission

Jan 29 Ca2+ and neurotransmitter release, EPSPs and IPSPs

Jan 31 Slow synaptic potentials

Feb 3 Synaptic integration

# Feb 5 Discussion/review

# Feb 7 Section #2 **EXAM**

***Section #3 Neurotransmitters, Receptors and Second Messengers (K.S.)***

Feb 10 Neurotransmitters

# Feb 12 Molecular mechanisms of neurotransmitter release

# Feb 14 Neurotransmitter receptors

Feb 17 **Presidents Day Holiday**

Feb 19 Second messenger pathways #1

Feb 21 Second messenger pathways #2

Feb 24 Synaptic plasticity

# Feb 26 Discussion/review

# Feb 28 Section #3 **EXAM**

**207L CELLULAR NEUROSCIENCE LABORATORY CLASS**

**36th Annual Edition -- March 11** - **20, 2019**

**1321 MH**

*(note the lab class runs through finals week)*

All-day every day, but flexible scheduling.

*Instructors: Ian Parker, Gyuri Lur, Ian Smith, Jeff Lock, Angelo Demuro*

**Experiments** (March 11 – 20)

1. Compound action potential of sciatic nerve. (I.P.)

2. Intracellular recording from muscle – resting potential, miniature end-plate potentials. (I.P.)

3. Quantal analysis of transmitter release at the muscle endplate. (I.P.)

4. *Xenopus* oocytes: voltage clamp and Ca2+-dependent Cl- currents evoked by IP3 (A.D.)

5. Total internal reflection microscopy of Ca2+ signals in neuroblastoma cells (J.L.)

6. Super-resolution imaging (I.S.)

7. Extracellular field recording from rat hippocampal slices. (G.L.)

**March 19:** Preparation for presentations

**March 20: Student presentations**  (Noon : pizza lunch provided)