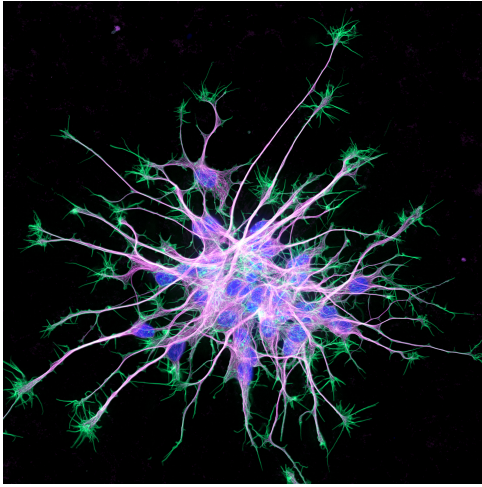


BI 610 (Fall 2023; 10920) Adv Cellular Neurosci

 Edit



Today in Class:

[JOD](https://canvas.uoregon.edu/courses/226186/pages/joke-of-the-day-signup-sheet) (<https://canvas.uoregon.edu/courses/226186/pages/joke-of-the-day-signup-sheet>)

[1FIG](https://canvas.uoregon.edu/courses/226186/pages/one-figure-sign-up-sheet) (<https://canvas.uoregon.edu/courses/226186/pages/one-figure-sign-up-sheet>)

[Canvas help: 541-346-1942]

[Updating worksheets: Files / upload. Syllabus, edit. Highlight existing link. Go to page icon. Select Course Documents.]

Module 0: Introduction

9/27 Personal introductions. Overview of syllabus and course mechanics. Team building.

[Presentation](https://canvas.uoregon.edu/courses/226186/files/16950581?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950581?wrap=1>) 

(https://canvas.uoregon.edu/courses/226186/files/16950581/download?download_frd=1) on recording techniques.

Read [Math Is the Great Secret](https://canvas.uoregon.edu/courses/226186/files/16950626?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950626?wrap=1>) 

(https://canvas.uoregon.edu/courses/226186/files/16950626/download?download_frd=1)

Module 1: Resting Potential

9/29 Topic: Equilibrium potentials, Nernst equations, constant product rule.

Read [Hille-Chapter-1](https://canvas.uoregon.edu/courses/226186/files/16950571?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950571?wrap=1>) 

(https://canvas.uoregon.edu/courses/226186/files/16950571/download?download_frd=1) pp 13-17 and

[Hodgkin-Horowicz-1959](https://canvas.uoregon.edu/courses/226186/files/16950522?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950522?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950522/download?download_frd=1) through Fig. 4.

Workshop [Worksheet 1.1](https://canvas.uoregon.edu/courses/226186/files/17035965?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/17035965?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/17035965/download?download_frd=1) . Worksheet 1.1 in class. [Answers](https://canvas.uoregon.edu/courses/226186/files/17043056?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/17043056?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/17043056/download?download_frd=1) .

10/04: Topic: Equilibrium potentials, Nernst equations, constant product rule (cont).

Read [Hodgkin-Horowicz-1959](https://canvas.uoregon.edu/courses/226186/files/16950522?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950522?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950522/download?download_frd=1) through Fig. 7.
Workshop in class. [Worksheet-1.2](https://canvas.uoregon.edu/courses/226186/files/16950504?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950504?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950504/download?download_frd=1) . [Answers](https://canvas.uoregon.edu/courses/226186/files/16950512?wrap=1)
(<https://canvas.uoregon.edu/courses/226186/files/16950512?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950512/download?download_frd=1) .

We will complete discussion of Hodgkin-Horowicz through Fig. 7.

Problem set 1 assigned: [Problem-set-resting-potential-V2.1](https://canvas.uoregon.edu/courses/226186/files/16950505?wrap=1)
(<https://canvas.uoregon.edu/courses/226186/files/16950505?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950505/download?download_frd=1) . [Problem-set-resting-potential-V2.1-answers.](https://canvas.uoregon.edu/courses/226186/files/16950506?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950506?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950506/download?download_frd=1)

Module 2: Electrical Membrane models

10/6 Topic: Circuit theory.

Read [Appendix A Review of Basic Circuit Theory](https://canvas.uoregon.edu/courses/226186/files/16950547?wrap=1)
(<https://canvas.uoregon.edu/courses/226186/files/16950547?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950547/download?download_frd=1) through the middle of p. 7.

Read p1-4 of [Basic Electricity and Solving Circuit Problems](https://canvas.uoregon.edu/courses/226186/files/16950509?wrap=1)
(<https://canvas.uoregon.edu/courses/226186/files/16950509?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950509/download?download_frd=1) .

Try to do problems 1-5 in the above reading before class.

Workshop: techniques for solving problems 1-5. [Answers.](https://canvas.uoregon.edu/courses/226186/files/16950508?wrap=1)
(<https://canvas.uoregon.edu/courses/226186/files/16950508?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950508/download?download_frd=1)

10/13 Topic: Steady-state membrane models.

Workshop [Worksheet-2.1.v3](https://canvas.uoregon.edu/courses/226186/files/16950510?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950510?wrap=1>)_ ↓
(https://canvas.uoregon.edu/courses/226186/files/16950510/download?download_frd=1) . [Answers](https://canvas.uoregon.edu/courses/226186/files/16950511?wrap=1)
(<https://canvas.uoregon.edu/courses/226186/files/16950511?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950511/download?download_frd=1) .

Problem set 2.1 assigned: [Problem-set-membrane-models-SS](#)

(<https://canvas.uoregon.edu/courses/226186/files/16950590?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950590/download?download_frd=1) . [Answers](#)

(<https://canvas.uoregon.edu/courses/226186/files/16950588?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950588/download?download_frd=1) .

10/18 Topic: Dynamical membrane models.

Read [Appendix A Review of Basic Circuit Theory](#)

(<https://canvas.uoregon.edu/courses/226186/files/16950547/download?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950547/download?download_frd=1) p. 7-10.

Read "[Neuronal Dynamics Ch1](#) (<https://canvas.uoregon.edu/courses/226186/files/16950611/download?wrap=1>)_ ↓ (https://canvas.uoregon.edu/courses/226186/files/16950611/download?download_frd=1) ."

Section 1.3.1 provides some functional context for dynamic membrane models.

Workshop [Worksheet 2.2](#) (<https://canvas.uoregon.edu/courses/226186/files/16950629?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950629/download?download_frd=1) . [Answers](#)

(<https://canvas.uoregon.edu/courses/226186/files/16950627?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950627/download?download_frd=1) .

Problem set 2.2 assigned: [Problem-set-membrane-models-dynamic](#)

(<https://canvas.uoregon.edu/courses/226186/files/16950630?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950630/download?download_frd=1) . [Answers](#)

(<https://canvas.uoregon.edu/courses/226186/files/16950631?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950631/download?download_frd=1) .

Module 3: Hodgkin-Huxley Model

Topic: Current-voltage relationships.

Read Hille Chapter 1 "[Introduction](#) (<https://canvas.uoregon.edu/courses/226186/files/16950571?wrap=1>)

↓ (https://canvas.uoregon.edu/courses/226186/files/16950571/download?download_frd=1) , " pp17-22

(focus particularly on Fig. 1.6).

Workshop: [Worksheet 3.1](#) (<https://canvas.uoregon.edu/courses/226186/files/16950634?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950634/download?download_frd=1) . [Answers](#)

(<https://canvas.uoregon.edu/courses/226186/files/16950635?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950635/download?download_frd=1) .

Topic: Ion-substitution and ionic conductances.

Read Hille Chapter 2 "[Classical Biophysics of the Squid Giant Axon](#)

(<https://canvas.uoregon.edu/courses/226186/files/16950583?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950583/download?download_frd=1) , " Figs. 2.6 - 2.12.

Workshop: [Worksheet 3.2](#) (<https://canvas.uoregon.edu/courses/226186/files/16950640?wrap=1>)_ ↓

(https://canvas.uoregon.edu/courses/226186/files/16950640/download?download_frd=1) . [Answers](#)

<https://canvas.uoregon.edu/courses/226186/files/16950639?wrap=1> ↓

https://canvas.uoregon.edu/courses/226186/files/16950639/download?download_frd=1 .

Topic: Rate constants, gating, and action potentials.

Read Hille chapter 2 [Classical Biophysics of the Squid Giant Axon](#)

<https://canvas.uoregon.edu/courses/226186/files/16950583?wrap=1> ↓

https://canvas.uoregon.edu/courses/226186/files/16950583/download?download_frd=1 " pp47-56. We will focus on Fig. 2.16-2.18, and eq. 2.4-2.20.

Workshop: [Worksheet 3.3](#) (<https://canvas.uoregon.edu/courses/226186/files/16950507?wrap=1>) ↓

https://canvas.uoregon.edu/courses/226186/files/16950507/download?download_frd=1 . The final problem

requires this [data file](#) (<https://canvas.uoregon.edu/courses/226186/files/16950602/download?wrap=1>) ↓

https://canvas.uoregon.edu/courses/226186/files/16950602/download?download_frd=1 . [Answers](#)

<https://canvas.uoregon.edu/courses/226186/files/16950652?wrap=1> ↓

https://canvas.uoregon.edu/courses/226186/files/16950652/download?download_frd=1 .

Further reading (optional).

[The Hodgkin-Huxley Heritage: From Channels to Circuits](#)

<https://canvas.uoregon.edu/courses/226186/files/16950619/download?wrap=1> ↓

https://canvas.uoregon.edu/courses/226186/files/16950619/download?download_frd=1

[Neuronal Dynamics, chapter 2.2, 2.3](#) ⇨ (<https://neurondynamics.epfl.ch/online/Ch2.html>)

Module 4: Ion Channel Gating (<https://canvas.uoregon.edu/courses/226186/modules/627545>)

<SKIP 2022> Topic: First detection of gating current.

Read [Armstrong 1973](#) (<https://canvas.uoregon.edu/courses/226186/files/16950612/download?wrap=1>) ↓

https://canvas.uoregon.edu/courses/226186/files/16950612/download?download_frd=1

Workshop: [Worksheet 4.1](#) (<https://canvas.uoregon.edu/courses/226186/files/16950641?wrap=1>) ↓

https://canvas.uoregon.edu/courses/226186/files/16950641/download?download_frd=1 . [Answers](#)

<https://canvas.uoregon.edu/courses/226186/files/16950552?wrap=1> ↓

https://canvas.uoregon.edu/courses/226186/files/16950552/download?download_frd=1 .

11/8: Molecular structure of ion channels

Read [Hille Ch. 3 excerpt](#) (<https://canvas.uoregon.edu/courses/226186/files/16950642?wrap=1>) ↓


https://canvas.uoregon.edu/courses/226186/files/16950642/download?download_frd=1

Read [Kuang 2015](#) (<https://canvas.uoregon.edu/courses/226186/files/16950609/download?wrap=1>) ↓

https://canvas.uoregon.edu/courses/226186/files/16950609/download?download_frd=1 . Focus on gating in the Kv channel family and Figs 1-5. Pay special attention to the 2R9R channel structure which is the subject of reference 53, the next paper in the reading list.

Read [Long 2007](#) (<https://canvas.uoregon.edu/courses/226186/files/16950606/download?wrap=1>) ↓


https://canvas.uoregon.edu/courses/226186/files/16950606/download?download_frd=1 . This original research article may be challenging to read, so give yourself extra time. Skip the sections "Conservation of structure in K⁺ channels" and "Lipid interactions."


Read [Bezanilla 2008](https://canvas.uoregon.edu/courses/226186/files/16950646/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950646/download?wrap=1>)  https://canvas.uoregon.edu/courses/226186/files/16950646/download?download_frd=1) (optional historical perspective)

Workshop: [Worksheet](https://canvas.uoregon.edu/courses/226186/files/16950644?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950644?wrap=1>)  https://canvas.uoregon.edu/courses/226186/files/16950644/download?download_frd=1) 4.2. [Answers](https://canvas.uoregon.edu/courses/226186/files/16950645?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950645?wrap=1>)  https://canvas.uoregon.edu/courses/226186/files/16950645/download?download_frd=1) .

Module 5: [Bursting Neurons](https://canvas.uoregon.edu/courses/226186/modules/627546) (<https://canvas.uoregon.edu/courses/226186/modules/627546>)

***SKIP 2022* Topic: Voltage-clamp analysis and modeling of cell-autonomous bursting in the Aplysia neuron R15.**



Read [Adams & Benson 1985](https://canvas.uoregon.edu/courses/226186/files/16950601/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950601/download?wrap=1>)  (https://canvas.uoregon.edu/courses/226186/files/16950601/download?download_frd=1) (optional). Focus on Section III, which provides the biophysical basis for the model presented in the Adams 1985.



Read [Adams 1985](https://canvas.uoregon.edu/courses/226186/files/16950579/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950579/download?wrap=1>)  (https://canvas.uoregon.edu/courses/226186/files/16950579/download?download_frd=1) . Focus on Figs. 1, 3,4, 6, 7, and 9.

Do [Worksheet 5.1](https://canvas.uoregon.edu/courses/226186/files/16950621/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950621/download?wrap=1>)  (https://canvas.uoregon.edu/courses/226186/files/16950621/download?download_frd=1) in class ([Worksheet 5.1 answers](https://canvas.uoregon.edu/courses/226186/files/16950617/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950617/download?wrap=1>)  (https://canvas.uoregon.edu/courses/226186/files/16950617/download?download_frd=1)) <https://canvas.uoregon.edu/courses/226186/files/16950579/download?wrap=1>)

Module 6: Cable Theory (<https://canvas.uoregon.edu/courses/226186/modules/627547>)

11/10 & 15 Topic: The cable equation


Read [Dayan & Abbott chapter 6.3](https://canvas.uoregon.edu/courses/226186/files/16950649/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950649/download?wrap=1>)  (https://canvas.uoregon.edu/courses/226186/files/16950649/download?download_frd=1) through equation 6.16. For definition of terms see [D&A chapter 5](https://canvas.uoregon.edu/courses/226186/files/16950541/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950541/download?wrap=1>)  (https://canvas.uoregon.edu/courses/226186/files/16950541/download?download_frd=1) .


Workshop: [Worksheet-6.1](https://canvas.uoregon.edu/courses/226186/files/16950654?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950654?wrap=1>)  (https://canvas.uoregon.edu/courses/226186/files/16950654/download?download_frd=1) . [Answers](https://canvas.uoregon.edu/courses/226186/files/16950656?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950656?wrap=1>)  (https://canvas.uoregon.edu/courses/226186/files/16950656/download?download_frd=1) .


Module 7: Synaptic transmission I - Presynaptic release mechanisms


(<https://canvas.uoregon.edu/courses/226186/modules/627548>)

11/17 Topic: Quantal analysis of synaptic transmission (Part A)

Read [Augustine 2007](https://canvas.uoregon.edu/courses/226186/files/16950661/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950661/download?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950661/download?download_frd=1) (optional historical perspective)



Read [Del Castillo and Katz 1954](https://canvas.uoregon.edu/courses/226186/files/16950657/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950657/download?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950657/download?download_frd=1) (main paper)

Read [Johnson & Wu Chapter 11](https://canvas.uoregon.edu/courses/226186/files/16950593?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950593?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950593/download?download_frd=1) , p293-4 and section 11.4.2.

Workshop: [Worksheet 7.1](https://canvas.uoregon.edu/courses/226186/files/16950658?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950658?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950658/download?download_frd=1) . [Answers](https://canvas.uoregon.edu/courses/226186/files/16950659?wrap=1)
(<https://canvas.uoregon.edu/courses/226186/files/16950659?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950659/download?download_frd=1) .

***SKIP 2022* 11/22 Topic: Quantal analysis of synaptic transmission (Part B)**

Review of Worksheet 7.1 answers


Workshop: [Worksheet 7.2](https://canvas.uoregon.edu/courses/226186/files/16950664?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950664?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950664/download?download_frd=1) . [Answers](https://canvas.uoregon.edu/courses/226186/files/16950663?wrap=1)
(<https://canvas.uoregon.edu/courses/226186/files/16950663?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950663/download?download_frd=1) .


Download [EPP-data-1](https://canvas.uoregon.edu/courses/226186/files/16950662?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950662?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950662/download?download_frd=1)

11/29 Topic: Transition day 2022

Before class: Do last problem of [Worksheet 7.2](https://canvas.uoregon.edu/courses/226186/files/16950664?wrap=1)

(<https://canvas.uoregon.edu/courses/226186/files/16950664?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950664/download?download_frd=1)

Read: [Nicoll 2017](https://canvas.uoregon.edu/courses/226186/files/16950584/download?wrap=1) (<https://canvas.uoregon.edu/courses/226186/files/16950584/download?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950584/download?download_frd=1) (required historical perspective)

We will review the answers to Worksheet 7.2 and discuss Nicoll 2017. [Malinow 1990](https://canvas.uoregon.edu/courses/226186/files/16950558/download?wrap=1)
(<https://canvas.uoregon.edu/courses/226186/files/16950558/download?wrap=1>) 
(https://canvas.uoregon.edu/courses/226186/files/16950558/download?download_frd=1) will be introduced.

Module 8: Synaptic transmission II - LTP (<https://canvas.uoregon.edu/courses/226186/modules/627550>)

12/1 Topic: Preliminary quantal analyses of LTP in hippocampal region CA1

Read: [Nicoll 2017 \(https://canvas.uoregon.edu/courses/226186/files/16950584?wrap=1\)](https://canvas.uoregon.edu/courses/226186/files/16950584?wrap=1) ↓
https://canvas.uoregon.edu/courses/226186/files/16950584/download?download_frd=1

Read: [Malinow 1990 \(https://canvas.uoregon.edu/courses/226186/files/16950558/download?wrap=1\)](https://canvas.uoregon.edu/courses/226186/files/16950558/download?wrap=1) ↓
https://canvas.uoregon.edu/courses/226186/files/16950558/download?download_frd=1 (main paper for workshop).

Workshop: [Worksheet-8.1 \(https://canvas.uoregon.edu/courses/226186/files/16950668?wrap=1\)](https://canvas.uoregon.edu/courses/226186/files/16950668?wrap=1) ↓
https://canvas.uoregon.edu/courses/226186/files/16950668/download?download_frd=1 . [Answers \(https://canvas.uoregon.edu/courses/226186/files/16950667?wrap=1\)](https://canvas.uoregon.edu/courses/226186/files/16950667?wrap=1) ↓
https://canvas.uoregon.edu/courses/226186/files/16950667/download?download_frd=1 . [Notes \(https://canvas.uoregon.edu/courses/226186/files/16950574?wrap=1\)](https://canvas.uoregon.edu/courses/226186/files/16950574?wrap=1) ↓
https://canvas.uoregon.edu/courses/226186/files/16950574/download?download_frd=1 on summation of synaptic potentials.

<SKIPPED 2022> Topic: Postsynaptic expression of LTP in hippocampal region CA1

Read: [Liao 1995 \(https://canvas.uoregon.edu/courses/226186/files/16950587/download?wrap=1\)](https://canvas.uoregon.edu/courses/226186/files/16950587/download?wrap=1) ↓
https://canvas.uoregon.edu/courses/226186/files/16950587/download?download_frd=1 (main paper for workshop).

Workshop: [Worksheet-8.2 \(https://canvas.uoregon.edu/courses/226186/files/16950578?wrap=1\)](https://canvas.uoregon.edu/courses/226186/files/16950578?wrap=1) ↓
https://canvas.uoregon.edu/courses/226186/files/16950578/download?download_frd=1 . [Answers \(https://canvas.uoregon.edu/courses/226186/files/16950557?wrap=1\)](https://canvas.uoregon.edu/courses/226186/files/16950557?wrap=1) ↓
https://canvas.uoregon.edu/courses/226186/files/16950557/download?download_frd=1 .

<date> Topic: Postsynaptic expression of LTP in hippocampal region CA1(cont.)

See above

End of course celebration with presentation of C. elegans chemosensory neuron model.

Cellular neuroscience and its significance

Cell biology and biophysics of neurons and synapses → Input-output functions of neurons

Course goals

Overview of biophysics of neurons (intrinsic signaling and synaptic transmission)

Development of skills in:

Quantitative reasoning

Critical evaluation of the primary scientific literature

Teaching philosophy

Less is more

Proponent of active learning (instructor as "coach")

Student-student collaborations encouraged*

Approach

Workshop format (mini lectures, in-class activities)

Readings (mainly classical original papers, supplemented by textbook chapters)

Worksheets* (in class)

Problem sets* (at home)

Teaching style is Socratic, but students can always "pass," without consequence, when called to answer a question.

* You are strongly encouraged to work together on class assignments.

Content

Mini-lectures, original articles and book chapters, workshops, worksheets, and problem sets

Source material (consider purchasing)

Hille, *Ion Channels of Excitable Membranes* (the most famous text book in cellular neuroscience)

Johnson and Wu, *Foundations of Cellular Neurophysiology* (excellent on biophysics of neurons)

Cook and Lipkin, *Cellular Neurophysiology* (compendium of classic papers)

Byrne, Heidelberger, Waxham, *From Molecules to Networks* (textbook)

Fain, *Molecular and Cellular Physiology of Neurons* (textbook)


Joke-of-the-day

Tell us a joke or funny story. To obtain credit, upload the joke or story in Assignments. [Sign-up sheet.](https://canvas.uoregon.edu/courses/226186/pages/joke-of-the-day-signup-sheet)
(<https://canvas.uoregon.edu/courses/226186/pages/joke-of-the-day-signup-sheet>)

One-figure, 5 min

Read an original research article in cellular neuroscience (no reviews, please). Show and explain figure from the paper. If plan to show physiological data (voltage, current, Ca²⁺ concentration etc.), please restrict yourself to intracellular signals from single neurons. Figures from non-physiological papers (e.g., anatomy, cell biology, molecular biology) are allowed in the case of single types of neurons. If you have questions about the suitability of material, please don't hesitate to ask the instructor for his opinion. [Sign-up sheet](https://canvas.uoregon.edu/courses/226186/pages/one-figure-sign-up-sheet) (<https://canvas.uoregon.edu/courses/226186/pages/one-figure-sign-up-sheet>).

Assessment

Completed worksheets and problem sets are to be uploaded to Canvas. If you are doing the work on hardcopies, they can be scanned to pdf files, then upload. Here's a link to a scanning app in the App Store if you have an iPhone: <https://apps.apple.com/us/app/adobe-scan-pdf-ocr-scanner/id1199564834>.  (<https://apps.apple.com/us/app/adobe-scan-pdf-ocr-scanner/id1199564834>)


Attendance (self-report at end of term*)	10%
Worksheets	60%
Problem sets	15%
Class participation	5%
Joke-of-the-day	5%
One figure, 5 min	5%

* Report $n - m$, where n is number of class periods, and m is number of unexcused absences. If you tell me ahead of time that you will miss class, for whatever reason, that is an excused absence.

Office hours

Fridays, 3-4 pm or by appointment

// Instructor note: Maybe add PIR //

// <https://www.tiny.cloud/docs/advanced/keyboard-shortcuts/> 
(<https://www.tiny.cloud/docs/advanced/keyboard-shortcuts/>) //