

PSB 6087 / PSB 4934
Behavioral and Cognitive Neuroscience I

Section: #2919 / #212G; **Class:** #23109 / #20836

Class Time: Tuesday period 7, 1:55 - 2:45 p.m. MAEA building, room 0303
Thursday periods 6-7, 12:50 - 2:45 p.m. Physics building, room NPB 1001

Professor: Darragh P. Devine, Ph.D.

dpdevine@ufl.edu

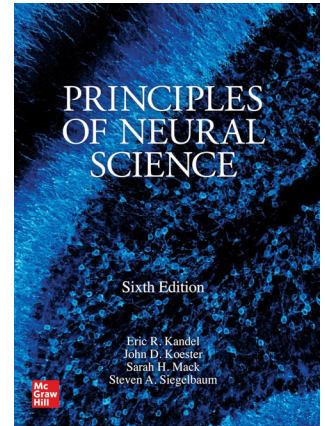
phone: 273-2174

office hours: Wednesday 1:55 - 2:45 p.m. and Friday 10:40-11:30 a.m.

Wednesday office hours are in-person in the Psychology Bldg., room PSY 337

Friday office hours are online at: Meeting ID: 960 3892 7978, Passcode: PSB6087

Required Textbook: *Principles of Neural Science, sixth edition. (2021)*, by E.R. Kandel, J.D. Koester, S.H. Mack, and S.A. Siegelbaum; ISBN #978-1-259-64223-4



COURSE COMMUNICATIONS: If students have questions about the website, general course content, or other online materials, they should consult the syllabus and the supporting materials in the START HERE module on the Canvas website.

Dr. Devine will be available to answer questions during office hours, or through e-mail. Any e-mailed questions will be answered within approximately 24-48 hours (questions on the weekend may wait until the beginning of the following week).

ATTENDANCE POLICY: Students are expected to attend all classes, and frankly, absence from classes will cause a student to miss information that will be tested on the quizzes and exams. Requirements for class attendance and make-up exams, assignments, and other work in the course are consistent with university policies. [See UF Academic Regulations and Policies for more information regarding the University Attendance Policies.](#)

COURSE OBJECTIVES: The purpose of this course is to provide a broad foundation (graduate level) in the neural basis of behaviour. Lectures and reading material will emphasize the cellular and molecular biology, anatomy, physiology, and development of the nervous system, neurobiology of sensation and motor function, motivational and regulatory systems, and cognitive neuroscience. The course is formulated primarily for first-year students in the Behavioral and Cognitive Neuroscience Program, and it is intended to assure that all students entering the program achieve equivalent levels of competence in the Behavioral Neurosciences.

The textbook provides adequate coverage of all these topics and some additional topics. We will cover those topics that are essential to be well-versed in the subject matter of Behavioral Neuroscience. Additional assigned readings will provide updated and more nuanced information about the topics we will cover. Those readings will be posted on the course website [note, the reading load will be demanding during some portions of the course, and I strongly suggest that you read ahead of class meetings - so plan accordingly].

GRADING: These courses will have three take-home exams and one optional final exam each semester. Each take-home exam will consist of a combination of multiple choice and short essay questions. Each take-home exam will cover only the text and lecture material from the chapters that have most recently been discussed in class. The final exam will be comprehensive (i.e. all the chapters that are covered during the semester). Students will receive a grade based upon the exams.

Each of the take-home exams will count 33⅓% toward your final grade. If you perform adequately on all take-home exams and are satisfied with your grade, you may skip the final exam. If you fail to turn in a take-home exam on time, or if you do poorly on an exam, you can drop that exam/grade and take the final exam to replace it. In this case your three *best* exam scores will each count 33⅓% of your total grade.

The final is the only option for a missed or failed exam. There will be no additional makeup tests under any circumstances. A penalty of 10% per day will be imposed for any examination that is turned in late.

The grading scheme is as follows:

Score (%)	Grade	Score (%)	Grade
93-100	A	73-76	C
90-92	A-	70-72	C-
87-89	B+	67-69	D+
83-86	B	63-66	D
80-82	B-	60-62	D-
77-79	C+	<60	E

A minimum grade of C is required for passing credit.

BCN 1 COURSE SCHEDULE:

For critical semester dates see <http://www.registrar.ufl.edu>

This schedule is ambitious. It will likely be modified during the semester.

Approximate Dates Chapter Topic

PART I. OVERALL PERSPECTIVE

Aug 22	Chapter 1:	The Brain and Behavior
Aug 27 - 29	Chapter 2:	Genes and Behavior
Sept 3 - 5	Chapter 3:	Nerve Cells, Neural Circuitry, and Behavior
Sept 10	Chapter 4:	The Neuroanatomical Basis by Which Neural Circuits Mediate Behavior
Sept 12 - 17	Chapter 5:	The Computational Basis of Neural Circuits That Mediate Behavior
Sept 19	Chapter 6:	Imaging and Behavior

week 6: take-home exam #1: Ch. 1-6, and all material from lectures (available Sept 20, due Sept 27 11:59 p.m.)

PART II. CELL AND MOLECULAR BIOLOGY OF THE NEURON

Sept 24 - 26	Chapter 7:	The Cells of the Nervous System
Oct 1 - 3	Chapter 8:	Ion Channels
Oct 8 - 10	Chapter 9:	Membrane Potentials and the Passive Electrical Properties of Neurons
Oct 15 - 17	Chapter 10:	Propagated Signaling: The Action Potential

week 10: take-home exam #2: Ch. 7-10, and all material from lectures (available Oct 18, due Oct 25 11:59 p.m.)

PART III. SYNAPTIC TRANSMISSION

Oct 22 - 24	Chapter 11:	Overview of Synaptic Transmission
Oct 29 - 31	Chapter 12:	Directly Gated Transmission: The Nerve-Muscle Synapse
Nov 5 - 7	Chapter 13:	Synaptic Integration in the Central Nervous System
Nov 12 - 14	Chapter 14:	Modulation of Synaptic Transmission and Neuronal Excitability: Second Messengers

Nov 19 - 21 Chapter 15: Transmitter Release

Nov 26-28 Thanksgiving break – no classes

Dec 3 Chapter 16: Neurotransmitters

week 15: take-home exam #3: Ch. 11-16 and all material from lectures (avail Dec 4, due Dec 8 11:59 p.m.)

final exam week: Comprehensive Final Exam - all chapters and lectures (avail Dec 9, due Dec 13 11:59 p.m.)

ADDITIONAL READINGS (papers will be available on the course website):

- Ch 1. Brown RE (2019). Why Study the History of Neuroscience? *Front Behav Neurosci* **13**: 82. [doi: 10.3389/fnbeh.2019.00082](https://doi.org/10.3389/fnbeh.2019.00082).
- Ch 2. Halldorsdottir T, Binder EB (2017). Gene x Environment Interactions: From Molecular Mechanisms to Behavior. *Annu Rev Psychol* **68**: 215-241. [doi: 10.1146/annurev-psych-010416-044053](https://doi.org/10.1146/annurev-psych-010416-044053).
- Ch 3. Luo L (2021). Architectures of neuronal circuits. *Science* **373**: eabg7285. [doi: 10.1126/science.abg7285](https://doi.org/10.1126/science.abg7285).
- Ch 4. Thiebaut de Schotten M, Forkel SJ (2022). The emergent properties of the connected brain. *Science* **378**: 505-510. [doi: 10.1126/science.abq2591](https://doi.org/10.1126/science.abq2591).
- Ch 5. Aery Jones EA, Giocomo LM (2023). Neural ensembles in navigation: From single cells to population codes. *Curr Opin Neurobiol* **78**: 102665. doi.org/10.1016/j.conb.2022.102665.
- Ch 6. Bennett CM, Baird AA, Miller MB, Wolford, GL (2010). Neural correlates of interspecies perspective taking in the post-mortem atlantic salmon: An argument for proper multiple comparisons correction. *J Serendipitous Unexpected Results* **1**: 1-5.
- Ch 7. Sleigh JN, Rossor AM, Fellows AD, Tosolini AP, Schiavo G (2019). Axonal transport and neurological disease. *Nat Rev Neurol* **15**: 691-703. [doi: 10.1038/s41582-019-0257-2](https://doi.org/10.1038/s41582-019-0257-2).

- Ch 8. Roux B (2017). Ion channels and ion selectivity. *Essays Biochem* **61**: 201-209. [doi: 10.1042/EBC20160074](https://doi.org/10.1042/EBC20160074).
- Ch 9. Stuart G, Spruston N, Sakmann B, Hausser M (1997). Action potential initiation and backpropagation in neurons of the mammalian CNS. *Trends Neurosci* **20**: 125-131. [doi: 10.1016/s0166-2236\(96\)10075-8](https://doi.org/10.1016/s0166-2236(96)10075-8).
- Ch 10. Huang CY, Rasband MN (2018). Axon initial segments: structure, function, and disease. *Ann N Y Acad Sci* **1420**: 46-61. [doi: 10.1111/nyas.13718](https://doi.org/10.1111/nyas.13718).
- Ch 11. Gutierrez R (2023). Gap Junctions in the Brain: Hardwired but Functionally Versatile. *The Neuroscientist* **29**: 554-568. [doi: 10.1177/10738584221120804](https://doi.org/10.1177/10738584221120804).
- Ch 12. Li L, Xiong W-C, Mei L (2018). Neuromuscular Junction Formation, Aging, and Disorders. *Annual Review of Physiology* **80**: 159-188. [doi: 10.1146/annurev-physiol-022516-034255](https://doi.org/10.1146/annurev-physiol-022516-034255).
- Ch 13. Chen H, Dong Y, Wu Y, Yi F (2023). Targeting NMDA receptor signaling for therapeutic intervention in brain disorders. *Rev Neurosci* **34**: 635-647. [doi: 10.1515/revneuro-2022-0096](https://doi.org/10.1515/revneuro-2022-0096).
- Ch 14. Newton AC, Bootman MD, Scott JD (2016). Second Messengers. *Cold Spring Harb Perspect Biol* **8**: a005926. [doi: 10.1101/cshperspect.a005926](https://doi.org/10.1101/cshperspect.a005926).
- Ch 15. Kavalali ET (2015). The mechanisms and functions of spontaneous neurotransmitter release. *Nat Rev Neurosci* **16**: 5-16. [doi: 10.1038/nrn3875](https://doi.org/10.1038/nrn3875).
- Ch 16. Reiner A, Levitz J (2018). Glutamatergic Signaling in the Central Nervous System: Ionotropic and Metabotropic Receptors in Concert. *Neuron* **98**: 1080-1098. [doi: 10.1016/j.neuron.2018.05.018](https://doi.org/10.1016/j.neuron.2018.05.018).

COURSE EVALUATIONS: Students are expected to provide professional and respectful feedback on the quality of this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, or in their Canvas course menu under GatorEvals, or via ufl.bluera.com/ufl/. Summaries of course evaluation results [are available to students here](#).

GETTING HELP: For issues with technical difficulties for E-learning in Canvas, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

** Any requests for special consideration due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail Dr. Devine within 24 hours of the technical difficulty if you wish to request any special considerations.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

ADDITIONAL SUPPORT FOR STUDENTS WITH DISABILITIES: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. [Click here to get started with the Disability Resource Center](#). It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

ACADEMIC HONESTY GUIDELINES: UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. [Click here to read the Conduct Code](#). If you have any questions or concerns, please consult with the instructor or TAs in this class.

In-Class Recording: Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Campus Resources: Health and Wellness

U Matter, We Care: If you or someone you know is in distress,

please contact <mailto:umatter@ufl.edu>, 352-392-1575, or visit [U Matter, We Care website](#) to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the [Counseling and Wellness Center website](#) or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the [Student Health Care Center website](#).

University Police Department: Visit [UF Police Department website](#) or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the [UF Health Emergency Room and Trauma Center website](#).

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the [GatorWell website](#) or call 352-273-4450.

Campus Resources: Academic Resources

E-learning technical support: Contact the [UF Computing Help Desk](#) at 352-392-4357 or via e-mail at <mailto:helpdesk@ufl.edu>.

[Career Connections Center:](#) Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

[Library Support:](#) Various ways to receive assistance with respect to using the libraries or finding resources. Call 866-281-6309 or email ask@ufl.libanswers.com for more information.

[Teaching Center:](#) 1317 Turlington Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

[Writing Studio:](#) Daytime (9:30am-3:30pm): 2215 Turlington Hall, 352-846-1138 | Evening (5:00pm-7:00pm): 1545 W University Avenue (Library West, Rm. 339). Help brainstorming, formatting, and writing papers.

Academic Complaints: Office of the Ombuds; Visit the [Complaint Portal webpage](#) for more information.

Enrollment Management Complaints (Registrar, Financial Aid, Admissions): View the Student Complaint Procedure webpage for more information.