FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Undergraduate Programs

Department N/A

College Honors College

*(To obtain a course number, contact **erudolph@fau.edu**)*

UUPC Approval 3/25/24
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

Prefix PCB

Number 4841

(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)

Lab Code

Type of Course Lecture

Course Title Honors Cellular Neuroscience

Credits *(See Definition of a Credit Hour)* 3

Effective Date *(TERM & YEAR)* Spring 2025

Grading *(Select One Option)*

Regular (●)

Sat/UnSat ( )

Course Description *(Syllabus must be attached; see Template and Guidelines)*

This course is designed for upper-level undergraduates looking to expand their understanding of the cellular mechanisms that make up the nervous system. They will explore the cells that make up the nervous system, the unique properties neurons possess, how neurons communicate and integrate signaling.

Prerequisites, with minimum grade*

PCB 3063, minimum C grade or permission of instructor

Corequisites

Registration Controls *(Major, College, Level)*

Honors

Default minimum passing grade is D-.** **Prereqs., Coreqs. & Reg. Controls are enforced for all sections of course

WAC/Gordon Rule Course

☐ Yes ☑ No

WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See WAC Guidelines.

Intellectual Foundations Program (General Education) Requirement *(Select One Option)*

None

General Education criteria must be indicated in the syllabus and approval attached to the proposal. See Intellectual Foundations Guidelines.

Minimum qualifications to teach course

PhD in Biology, Neuroscience, or related field

Faculty Contact/Email/Phone

William O'Brien/wobrien@fau.edu/6-8033

List/Attach comments from departments affected by new course

See attached

Approved by		***Date***
Department Chair	[signature]	2/29/24
College Curriculum Chair	Rachel Corr	1/23/24
College Dean	[signature]	2/29/24
UUPC Chair	Korey Sorge	3/25/24
Undergraduate Studies Dean	Dan Meeroff	3/25/24
UFS President		
Provost		

Email this form and syllabus to mjenning@fau.edu seven business days before the UUPC meeting.

PCB 4841
Honors Cellular Neuroscience
T/Th 12:30-1:50pm
3 credits
Spring 2025
Instructor: Dr. Casey Spencer
Email: Cspenc27@fau.edu
Office hours: SR 247, T/Th- 8-9am, 2-3pm

Course description

This course is designed for upper-level undergraduates looking to expand their understanding of the cellular mechanisms that make up the nervous system. Students will explore the cells that make up the nervous system, the unique properties neurons possess, how neurons communicate and integrate signaling.

This course will use a combination of textbook (From Neuron to Brain, 6th Edition, A. Robert Martin), assigned literature reviews, or studies, and a unique neurophysiology modeling/simulation software (NeuroSim5). The simulation software will be used in class and "experiments" will be performed and used as a discussion to offer students an alternate learning tool. This course will stop just short of systems level neuroscience, in order to focus in on the cell and cell to cell interactions for the semester.

Instructional Method

In-Person. There is no remote option for this course.

Anything covered on this syllabus is subject to change and that changes will be announced through Canvas. Enable all notifications in Canvas so you receive announcements related to this course. Students are also required to check their FAU e-mail regularly. If you have any technical issues or questions about Canvas or other technical issues, be sure to contact OIT (http://www.fau.edu/oit/index.php). The instructor cannot provide tech support.

PowerPoints and other readings will be posted to Canvas.

Please note that in the unlikely event that a portion of the course must temporarily be moved online (for example, if the instructor is isolating/quarantined and temporarily cannot teach in person or if changes are mandated by the university), Zoom would be used as the videoconferencing tool for the course. As such, students should have a computer and reliable internet access to access materials in Canvas (and Zoom if needed).

Prerequisites

PCB 3063 (Genetics) with grade of C or better, or permission of instructor.

Note on Honors Distinction: This is an Honors class and differes from its non-honors counterpart in terms of the time and work required. It is designed to fit into an interdisciplinary curriculum that emphasizes critical thinking and proficiency in writing. Students are expected to develop skills that will prepare them to undertake research and produce an Honors Thesis.

Course Objectives

In this course, students will:

- Learn different neuron types, morphologies, and cell components.
- Learn about cell types that support neurons, and their roles.
- Understand the unique properties neurons possess and how signaling is integrated.
- Understand how neurons develop, degenerate, regenerate, and repair.
- Use a neurophysiology simulation software (NeuroSim5) to further develop an understanding of the role's ions, channels, receptors, and ligands have in the electrical/chemical cascades necessary for neuronal function.
- Use primary studies and literature reviews to complete an assessment of a topic covered during the semester and communicate it to the class to further develop scientific communication skills.

Grading-

3 exams:	100 points each
Review paper:	50 points
Presentation:	50 points
In class discussions (extra credit):	(up to 20 points)
Final exam:	100 points
Total:	**500 points**

GRADING SCALE:

Grade	Percentage (%)
A	>93%
A-	>90% - 93%
B+	>87% - 90%
B	>83% - 87%
B-	>80% - 83%
C+	>77% - 80%
C	>73% - 77%
C-	>70% - 73%

D+	>67% - 70%
D	>63% - 67%
D-	>60% - 63%
F	<60%

Policy on Makeup Tests, Late Work, and Incompletes

Make-up exams or research discussion activities will be given only if the student contacts the instructor either before the exam or discussion activity or within 48 hours after the exam or discussion activity and arranges to provide appropriate documentation (such as a doctor's note, e-mail advisory from Student Health, a walk-in clinic, etc. to isolate, etc.). DO NOT COME TO CLASS if you are feeling ill. You have the opportunity contact student health, go to a walk-in clinic (there are two right near campus) or other doctor's office, and/or schedule a telehealth appointment with SHS or another clinic if you feel ill and need documentation, so there are many options available to you to get appropriate documentation. If you miss a lecture due to illness, the class materials will be posted to Canvas, and I'd be happy to discuss the material with you by appointment during office hours if you have questions about what you missed.

Please remember that even though the clinic on the Jupiter campus is only open a few days per week, you can call the MAIN SHS number 561-297-3512 during business hours on weekdays for assistance or to request a telehealth appointment.

If a student misses one regular exam and does not provide appropriate documentation of a university approved excuse to the instructor within 48 hours of the missed exam (in order to schedule a make-up exam), that exam will count as the student's dropped exam. If the student misses two or more exams without appropriate documentation, only the first missed exam will be dropped, and the student will receive a zero for subsequent unexcused missed exams. This same policy holds true for research discussion activities. Please note that the final exam cannot be dropped.

Please contact the instructor if you have questions or concerns about your specific situation. If a conflict (such as a medical school interview) is known in advance, please contact your instructor immediately with a written excuse, and alternate plans may be arranged. Reasonable accommodation will be made for students participating in a religious observance. Please note that scheduled vacations are not a valid reason for an excused absence. If a student is unable to complete the required coursework for health or family reasons, an 'incomplete' may be issued for the course following approval. Note that an incomplete cannot be given to students who have less than a C- in the course.

The University policy states that a student who is passing a course but has not completed all work due to exceptional circumstances, may, with consent of the instructor, temporarily receive a

grade of incomplete ("I"). The assignment of the "I" grade is at the discretion of the instructor but is allowed only if the student is passing the course with a C- or better.

Classroom Etiquette Policy

Disruptive behavior is defined in the FAU Student Code of Conduct as "... activities which interfere with the educational mission within classroom." Students who disrupt the educational experiences of other students and/or the instructor's course objectives in a face-to-face or online course are subject to disciplinary action. Such behavior impedes students' ability to learn or an instructor's ability to teach. Disruptive behavior may include but is not limited to non-approved use of electronic devices (including cellular telephones); cursing or shouting at others in such a way as to be disruptive; or, other violations of an instructor's expectations for classroom and online conduct.
For more information, please see the FAU Office of Student Conduct.

Policy on the Recording of Lectures

Students enrolled in this course may record video or audio of class lectures *for their own personal educational use.* A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. *Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.*

Attendance Policy

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/

Disability Policy

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

Code of Academic Integrity

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001.

Plagiarism is unacceptable in the University community. Academic work must be an original work of your own thought, research, or self-expression. When students borrow ideas, wording, or organization from another source, they must acknowledge that fact in an appropriate manner. Plagiarism is the deliberate use and appropriation of another's work without identifying the source and trying to pass off such work as one's own. Any student who fails to give full credit for ideas or materials taken from another has plagiarized. If in doubt, cite your source.

Wilkes Honors College Honor Code: All students agree to adhere to the honors code, available online at: http://www.fau.edu/honors/academics/honor-code.php

Required Texts/Readings

From Neuron to Brain 6th Edition

Author(s): A. Robert Martin; David A. Brown; Mathew E. Diamond; Antonino Cattaneo; Francisco F. De-Miguel

Publisher: Sinauer Associates is an imprint of Oxford University Press

ISBNs- 1605359335, VENX0YKM7X, 9780197533635, 9781605359335, 9781605354392

Powerpoint slides and additional materials, such as activities, review sheets, and research articles will be posted to Canvas. A "Resources" module will contain helpful material including

resources to support students, and as the semester progresses, it will be updated with information on scholarships, research, scientific lectures, and other professional development opportunities. I will review the use of Canvas and expectations for the course with you during the first day of class.

Time Commitment per Credit Hour

This course has 3 credit hours. For traditionally delivered courses, one (1) hour of classroom or direct faculty instruction each week for fifteen (15) weeks per Fall or Spring semester, and a minimum of two (2) hours of out-of-class student work per week (including reading and studying) is expected *for each credit hour*. Equivalent time and effort are required for Summer Semesters, which usually have a shortened time frame. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

Course Communication Policy

EXPECTATIONS FOR STUDENTS

Announcements/e-mail

You are responsible for reading all announcements and e-mails sent by the instructor. Check the course announcements each time you log in. You are responsible for reading all your course email and responding in a timely manner. Be sure to set up notifications in Canvas so that you receive all notifications for the course. Students should use check their FAU e-mail regularly and use that e-mail address when communicating with the instructor. **Always use your FAU e-mail account or Canvas to e-mail me – do not use other accounts, such as your personal g-mail account.**

Electronic Communication Policy

In addition to the University's policy, please consider the following:

- Privacy, confidentiality, and security in all electronic communications.
- All electronic communication resources must be used for the course and in alignment with to the University mission.
- Prohibited use of false identity, false identity pseudonyms, or anonymous (sender's name or electronic identification is hidden).
- Access without consent, disruption of services including introducing computer contaminants (viruses), and harassment of any kind are prohibited

Please see the Office of Information Technology's policies on Cyber Security Awareness.

Office hours: See the first page of the syllabus for office hours. I encourage students to see me during office hours with any questions or concerns. Appointments are strongly recommended. If your class schedule prevents you from meeting during my posted office hours, let me know, and I will do my best to work something out.

Course-Related Questions
Questions are welcomed! In addition to asking questions in class, you may also e-mail me at cspenc27@fau.edu or come to office hours with questions. Except weekends and holidays, the instructor will generally answer questions within 48 hours. Please don't hesitate to reach out to me - I'm here to help!

Course Topical Outline

Honors Cellular Neuroscience
Textbook: **From Neuron to Brain 6th Edition, A. Robert Martin**
Course Outline
This outline is subject to change by the instructor, and will be updated accordingly during the semester

Tuesday, Jan 9	Introduction and overview	Syllabus
Thursday, Jan 11	Principles of signaling and organization	Ch 1
Tuesday, Jan 16	Ion channels and signaling	Ch 4
Thursday, Jan 18	Structure of ion channels	Ch 5
Tuesday, Jan 23	Ionic basis of the resting potential	Ch 6, NeuroSim5 experiments
Thursday, Jan 25	Ionic basis of the action potential	Ch 7, NeuroSim5 experiments
Tuesday, Jan 30	Electrical signaling in neurons	Ch 8, NeuroSim5 experiments
Thursday, Feb 1	Exam 1	Covers Ch 1, 4, 5, 6, 7, 8
Tuesday, Feb 6	Ion transport across cell membranes	Ch 9
Thursday, Feb 8	Neuroglia	Ch 10
Tuesday, Feb 13	Mechanisms of direct synaptic transmission	Ch 11
Thursday, Feb 15	Indirect mechanisms of synaptic transmission	Ch 12
Tuesday, Feb 20	Transmitter release	Ch 13
Thursday, Feb 22	Transmitters in the CNS	Ch 14

Tuesday, Feb 27	Transmitter synthesis, storage, transport, and inactivation	Ch 15
Thursday, Feb 29	Exam 2	Covers Ch 9, 10, 11, 12, 13, 14, 15
March 5th and 7th	Spring Break, No class	
Tuesday, March 12	Synaptic Plasticity	Ch 16, 17
Thursday, March 14	Extra synaptic communication	Ch 18
Tuesday, March 19	Sensory Transduction	Ch 21
Thursday, March 21	Transduction and transmission in the retina	Ch 22
Tuesday, March 26	Touch, pain, and texture sensation	Ch 23
Thursday, March 28	Exam 3	Covers Ch 16, 17, 18, 21, 22, 23
Tuesday, April 2	Development of the nervous system	Ch 27
Thursday, April 4	Regeneration and repair of synaptic connections after injury	Ch 29
Tuesday, April 9	Review of topics to be covered on final exam	All topics covered, but what is most important for the final
Thursday, April 11	Presentations	
Tuesday, April 16	Presentations	
Thursday, April 18	Presentations	
Tuesday, April 23	No class (reading day)	
Thursday, April 25	**Exam 4 (Final exam) 10:30am-1:00pm** *Note different time, but same classroom*	Cumulative