FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Undergraduate Programs

Department Biology Department

College CESCOS

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

UUPC Approval 2/26/24
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

Prefix PCB

Number 4852

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

Lab Code

Type of Course: Lecture

Course Title: Genes, Neurons and Behavior

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 to understand the neural basis of behavior at the single neuron level. We will read original research papers that use the most up to date methods in genetics, electrophysiology and behavior in a field now called "optogenetics". The objective of the course is to integrate your work in related courses (such as Comparative Animal Behavior, Biological Basis of Behavior, Genetics or Neuroscience) to gain an in depth understanding of the field of neuroscience and behavior. The course will include neural simulations (run on Biology computers) designed to enhance your understanding of neuron function. This course will also introduce you to the laboratories doing modern research in this field on the various FAU campuses. In some instances it will lead you toward graduate programs at FAU and elsewhere in the USA.

Prerequisites, with minimum grade*
none

Corequisites
none

Registration Controls *(Major, College, Level)*

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

Member of the FAU biology faculty and has a terminal degree in the subject area (or a closely related field).

Faculty Contact/Email/Phone

Dr. Murphey/rmurphey@fau.edu/561-297-0383

List/Attach comments from departments affected by new course

Approved by		***Date***
Department Chair	Sarah L. Murphy	2-1-24
College Curriculum Chair		2/15/24
College Dean		2-15-24
UUPC Chair	Korey Sorge	2/26/24
Undergraduate Studies Dean	Dan Moerchoff	2/26/24
UFS President		
Provost		

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

FLORIDA ATLANTIC UNIVERSITY

PCB 4852

Genes, Neurons and Behavior
3 credits
Tuesday, Thursday 2:00 PM - 3:20 PM
Location: SC 119
Spring 2025 - 1 Full Term

Instructor Information

Rodney Murphey
Email: rmurphey@fau.edu
Office:Sanson 213
Office Hours: Tuesday/Thursday 3:20-4:20pm
Phone:561-297-0383

TA Name:
Office Hours:
Telephone:
Email:

Course Description

This course is designed to understand the neural basis of behavior at the single neuron level. We will read original research papers that use the most up to date methods in genetics, electrophysiology and behavior in a field now called "optogenetics". The objective of the course is to integrate your work in related courses (such as Comparative Animal Behavior, Biological Basis of Behavior, Genetics or Neuroscience) to gain an in depth understanding of the field of neuroscience and behavior. The course will include neural simulations (run on Biology computers) designed to enhance your understanding of neuron function. This course will also introduce you to the laboratories doing modern research in this field on the various FAU campuses. In some instances it will lead you toward graduate programs at FAU and elsewhere in the USA.

suggested pre-requisites, any of the following:

.comparative Animal Behavior, Biological Basis of Behavior, Neurophysiology, Genetics and Genetics Lab

- Or contact the instructor at: rmurphey@fau.edu or the TA Casey Spencer at: csoenc27@.fau.edu

Instructional Method

In-Person

Traditional concept of in person. Mandatory attendance is at the discretion of the instructor.

Required Texts/Materials

None required

Course Objectives/Student Learning Outcomes

Students will be exposed to the original scientific literature in the field, taught to read the articles and critically assess the available literature and integrate their efforts into a comprehensive view of the field.

Faculty Rights and Responsibilities

Florida Atlantic University respects the rights of instructors to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede their exercise. To ensure these rights, faculty members have the prerogative to:

- Establish and implement academic standards.
- Establish and enforce reasonable behavior standards in each class.
- Recommend disciplinary action for students whose behavior may be judged as disruptive under the Student Code of Conduct University Regulation 4.007.

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/.

Course Evaluation Method

Answers to homework questions on the readings will be scored and represent 40% of the grade, computer simulation work will represent 20% of the grade and a capstone written review of an original paper in the field will represent 40% of the grade

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.

Attendance Policy Statement

Students are expected to attend all 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-imposedlegal 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.

Religious Accommodation Policy Statement

In accordance with the rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs regarding admissions, registration, class attendance, and the scheduling of examinations and work assignments. University Regulation 2.007, Religious Observances, sets forth this policy for FAU and may be accessed on the FAU website at www.fau.edu/regulations.

Any student who feels aggrieved regarding religious accommodations may present a grievance to the director of Equal Opportunity Programs. Any such grievances will follow Florida Atlantic University's established grievance procedure regarding alleged discrimination.

Time Commitment Per Credit Hour

For traditionally delivered courses, not less than 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 for each credit hour. Equivalent time and effort are required for Summer Semesters, which usually have a shortened timeframe. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

Course Grading Scale

Letter Grade	Letter Grade
A	94-100%
A-	90 - 93%
B+	87 - 89%
B	83- 86%
B-	80- 82%
C+	77 - 79%
C	73 - 76%
C-	70- 72%
D+	67 - 69%
D	63 - 66%
D-	60 - 62%
F	Below60

Grade Appeal Process

You may request a review of the final course grade when you believe that one of the following conditions apply:

- There was a computational or recording error in the grading.
- The grading process used non-academic criteria.
- There was a gross violation of the instructor's own grading system.

University Regulation 4.002 of the University Regulations contains information on the grade appeals process

Policy on Make-up Tests, Late work, and Incompletes

Adjustments for late work will be determined as needed.

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.

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/

Student Support Services and Online Resources

- Center for Learning and Student Success (CLASS)
- Counseling and Psychological Services (CAPS)
- FAU Libraries
- Math Learning Center
- Office of Information Technology Helpdesk
- Office of International Programs and Study Abroad
- Office of Undergraduate Research and Inquiry (OURI)
- Science Learning Center
- Speaking Center
- Student Accessibility Services
- Student Athlete Success Center (SASC)

- Testing and Certification
- Test Preparation
- University Academic Advising Services
- University Center for Excellence in Writing (UCEW)
- Writing Across the Curriculum (WAC)

Course Topical Outline

SYLLABUS for Genes Neurons Behavior

Date and Title	Readings (available in Canvas) Simulation work (Sanson rm 176-177)
• Week 1. • Survey of your background and interests. • Introduction. What is Optogenetics?	• Friedman (2021) • Miller Science, (2006) • Muto Kawakami (2013)
• Week 2. A guide to electrophysiology of single neurons	• Neurosim5 computer simulations (Sanson computer rooms rm 176-177)
• Week 3 Computer simulation of optogenetics in single neurons	• Neurosim5 computer simulations (Sanson computer rooms 176-177)
• Week 4. What are Command cells? - a history	• Crayfish chapter (in Canvas) • Computer Simulations
• Week 5. Screening for command cells in flies with optogenetics	• Louis and Simpson, Descending neurons (2018)
• Week 6. Command cells for walking	• Bidaye et al (2014) Control of walking. •
• Week 7 Fly escape and the beginning of optogenetics	• Frye, Should I land or jump... (2019) •
• Week 8. Command cells in fish the Mauthner cell	• Mauthner cell chapter (in Canvas) • Maclean, Voltage Imaging (xxxx)

• Week 9 Locomotor control circuitry in fish	• Christie Severi (2021) Motor behavior ... circuit for zebrafish escape
• Week 10 The sensory-motor interface. Zebra-fish Prey capture circuitry	• Nikolaou and Meyer (2015) Imaging prey capture circuits.
• Week 11 Prey capture and retino-tectal continued	• Privat and Sumbre (2019) the zebrafish strikes back
• week 12 Hippocampal learning Place cells optogenetics in mammals	• Low and Giocomo, 50 years of place cells (2021)
• week 13 Mouse prey capture	• Berson (2021) Keep both eyes on the prize; Hunting mice use binocular vision...
• Week 14 optogenetics learning and memory	
• Week 15 Spatial orientation	• Plit and Giacomo, comment on Robinson (2021)