

BI-411 Advanced Human Physiology II: Neurophysiology **Spring 2026 Syllabus**

Class: Tuesday/Thursday 8:30am – 9:50am, Henry 203

Instructor Information:

Kat Yamamoto, Ph.D.

Adjunct Professor of Biology, School of Natural Sciences and Mathematics

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Email is my primary form of communication, please allow 24 hour response time.

Office Hours:

9:50am-10:50am Tuesdays; and by appointment on zoom. To be further discussed in class.

Required text: Neuroscience Exploring the Brain, 3rd edition or higher. By Bear, Connors, and Paradiso.
All other reading materials will be provided.

Course Description:

Fundamentals of neurophysiology from the cellular to the system levels. Discussion of neuroanatomy followed by the ionic and pharmacological basis of nerve and synaptic function. Specialized neuronal geometries and synaptic circuitries associated with a variety of sensory, motor and central systems. The laboratory covers extracellular and intracellular techniques in neurophysiology as well as sectioning and immunocytochemistry.

Prerequisites: EN-102, COM-101, BI-307, BI-307L

Co-requisite: BI-411L

Time Allocation:

The unit of semester credit is defined as university-level credit that is awarded for the completion of coursework. One credit hour reflects the amount of work represented in the intended learning outcomes and verified by evidence of student achievement for those learning outcomes. Each credit hour earned at Chaminade University should result in 37.5 hours of engagement. This is a three-credit hour course requiring 112.5 hours of engagement. There are ~37.5 instructional hours this semester. Students are expected to engage in reading and other assignments outside of class for at least 5 hours per week, which equals 75 hours. These two sums result in total student engagement time of 112.5 hours.

Technical Assistance for [Canvas](#):

- Search for help on specific topics or get tips in [Canvas Students](#)
- [Live chat with Canvas Support for students](#)
- Canvas Support Hotline for students: +1-833-209-6111
- [Online guide](#)
- Contact the Chaminade IT Helpdesk for technical issues: helpdesk@chaminade.edu or call 808-735-4855

Learning Outcomes:

Marianist Values

This class represents one component of your education at Chaminade University of Honolulu. An education in the Marianist Tradition is marked by five principles and you should take every opportunity possible to reflect upon the role of these characteristics in your education and development:

1. Education for formation in faith
2. Provide an integral, quality education
3. Educate in family spirit
4. Educate for service, justice and peace
5. Educate for adaptation and change

Native Hawaiian Values

Education is an integral value in both Marianist and Native Hawaiian culture. Both recognize the

transformative effect of a well-rounded, value-centered education on society, particularly in seeking justice for the marginalized, the forgotten, and the oppressed, always with an eye toward God (Ke Akua). This is reflected in the 'Olelo No'eau (Hawaiian proverbs) and Marianist core Beliefs:

1. Educate for Formation in Faith (Mana) E ola au i ke akua ('Olelo No'eau 364) May I live by God
2. Provide an Integral, Quality Education (Na'auao) Lawe i ka ma'aalea a kū'ono'ono ('Olelo No'eau 1957) Acquire skill and make it deep
3. Educate in Family Spirit ('Ohana) 'Ike aku, 'ike mai, kōkua aku kōkua mai; pela iho la ka nohana 'ohana ('Olelo No'eau 1200) Recognize others, be recognized, help others, be helped; such is a family relationship
4. Educate for Service, Justice and Peace (Aloha) Ka lama kū o ka no'eau ('Olelo No'eau 1430) Education is the standing torch of wisdom
5. Educate for Adaptation and Change (Aina) 'A'ohe pau ka 'ike i ka hālau ho'okahi ('Olelo No'eau 203) All knowledge is not taught in the same school

Student Learning Outcomes for the Class	Linkage to Program Learning Outcomes
1) Understand how the different cells of the nervous system function independently and as a unit.	PLO 4,5
2) Be able to describe how neurons communicate with each other and the limits of plasticity in this system.	PLO 1,2,4,5,6
3) Examine the processes important for the development of the nervous system.	PLO 1,2,4,5,6
4) Understand the structural and physiological adaptations of the nervous system through evolution.	PLO 1-4, 7
5) Appreciate the physiological mechanisms behind the various human sensory organs.	PLO 1,2,3,5,6

Biology Program Learning Outcomes:

Upon completion the program in Biology, a graduating student will demonstrate the following competencies:

1. Apply the scientific method in the design and testing of hypotheses
2. Transform and display, statistically evaluate, validate, and interpret scientific data and communicate the results of such analyses effectively both orally and in writing
3. Acquire, summarize, and synthesize information from published scientific literature, databases and bioinformatics software to extract and interpret biological data
4. Recognize the chemical and physical principles that underlie all life forms, and the biological organization at the molecular, cellular, tissue, organ, organism, and system levels that emerge from these principles
5. Define the components and processes of genetic and epigenetic information transmission, and their determinant effects on the adaptive and evolutionary processes that they drive
6. Evaluate the etiology of major human disease burden in terms of, pathophysiological mechanisms, epidemiology within populations and possible therapeutic approaches
7. Integrate an awareness of bioethical issues to positively influence the application of science to service, justice and peace in the solution of societal problems

Course Elements:

This course provides an upper division presentation of Neurophysiology. It also constantly refers to other foundational materials studied in previously taken science classes. It starts with an overview of the human central nervous system (CNS) and then covers the principles of neurophysiology, chemistry and anatomy. It also focuses on the central control of movement and the physiological mechanisms responsible for the translation of sensory information into the CNS. Thus, the fundamentals of neuroscience, from the cellular to the systemic level will be discussed, including both a discussion of the neuroanatomy followed by the ionic and

pharmacological basis of nerve and synaptic function, and also specialized neuronal geometries and synaptic circuitries associated with a variety of sensory, motor and central systems. Students are responsible for all text assignments, as well as supplementary handouts. Students are encouraged to read ahead to keep up with the high volume of material.

Grading Scale:

A	Excellent	>90%	450 points or more
B	Good	>80%	400 points
C	Average	>70%	350 points
D	Below Average	>60%	300 points
F	Failure	<60%	299 points or less

Assignments and Grading:

<u>Specific Assignment</u>	<u>Points</u>	<u>% of Grade</u>	<u>Due Date</u>
Attendance & Participation	50	10%	Each week
Weekly Assignments	75	15%	See schedule
Final project	75	15%	End of semester (4/28)
Semester exams	150	30%	Three in semester
Final exam	150	30%	Final week of semester

Attendance:

Students are expected to attend all classes. Students should notify their instructor when illness or other extenuating circumstances prevents them from attending class and make arrangements to complete missed assignments. Makeup exams are not given unless a student is ill and contacts the instructor prior to class. A doctor's written excuse should be supplied. When illness or personal reasons necessitate continued absence, the student should communicate first with the instructor to review the options. 2 or more unexcused absences will result in a grade reduction. Anyone who stops attending a course without official withdrawal may receive a failing grade or be withdrawn by the instructor at the instructor's discretion.

Tardiness:

Reasons for tardiness should be explained after class. Repeated tardiness will lead to a grade reduction.

Late Assignments:

Weekly assignments should be turned in on Canvas by the due date listed. However, I allow assignment submissions for an additional 24 hours after the deadline, in exchange for an automatic penalty of 25%. No late assignments are accepted after 24 hours. This practice only applies to weekly assignments, and not exams or the final project.

Electronic Devices:

Use of music devices and cell phones is prohibited during all School of Natural Science and Mathematics classes at Chaminade, unless specifically permitted by your instructor. Recording lectures is not permitted. You will be asked to leave class and will be marked absent if you do not comply. Please refer any questions to the Dean of Natural Sciences and Mathematics.

Additional Departmental and University Policies:

1. Academic Honesty

Academic honesty is an essential aspect of all learning, scholarship, and research. It is one of the values regarded most highly by academic communities throughout the world. Violations of the principle of academic honesty are extremely serious and will not be tolerated.

Students are responsible for promoting academic honesty at Chaminade by not participating in any act of dishonesty and by reporting any incidence of academic dishonesty to an instructor or to a University official. Academic dishonesty may include theft of records or examinations, alteration of grades, and plagiarism, in addition to more obvious dishonesty.

Questions of academic dishonesty in a particular class are first reviewed by the instructor, who must make a report with recommendations to the Dean of the Academic Division. Punishment for academic dishonesty will be determined by the instructor and the Dean of Academic Division and may include an "F" grade for the work in question, an "F" grade for the course, suspension, or dismissal from the University.

For the most up to date information, please refer to the [Academic Honesty Policy](#) on the Chaminade University Catalog website.

2. Title IX and Nondiscrimination Statement

Chaminade University of Honolulu is committed to providing a learning, working and living environment that promotes the dignity of all people, inclusivity and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator.

3. Nondiscrimination Policy & Notice of Nondiscrimination

Chaminade University of Honolulu does not discriminate on the basis of sex and prohibits sex discrimination in any education program or activity that it operates, as required by Title IX and its regulations, including in admission and employment. Inquiries about Title IX may be referred to the University's Title IX Coordinator, the U.S. Department of Education's Office for Civil Rights, or both and contact information may be found at the [Chaminade University Title IX Office Contact Information and Confidential Resources website](#). On-campus Confidential Resources may also be found here at [CAMPUS CONFIDENTIAL RESOURCES](#).

The University's Nondiscrimination Policy and Grievance Procedures can be located on the University webpage at: <https://chaminade.edu/compliance/title-ix-nondiscrimination-policies-procedures/>.

To report information about conduct that may constitute sex discrimination or make a complaint of sex discrimination under Title IX, please refer to the [Campus Incident Report form](#). Chaminade University of Honolulu prohibits sex discrimination in any education program or activity that it operates. The NOTICE of NONDISCRIMINATION can be found here: [Notice of Nondiscrimination](#).

4. CUH Alert Emergency Notification

To get the latest emergency communication from Chaminade University, students' cell numbers will be connected to Chaminade's emergency notification text system. When you log in to the Chaminade portal, you will be asked to provide some emergency contact information. If you provide a cellphone number, you will receive a text from our emergency notification system asking you to confirm your number. You must respond to that message to complete your registration and get emergency notifications on your phone.

5. Assessment for Student Work

With the goal of continuing to improve the quality of educational services offered to students, Chaminade University conducts assessments of student achievement of course, program, and institutional learning outcomes. Student work is used anonymously as the basis of these assessments, and the work you do in this course may be used in these assessment efforts.

6. Student with Disabilities Statement

Chaminade University of Honolulu offers accommodations for all actively enrolled students with disabilities in compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act (ADA) of 1990, and the ADA Amendments Act (2008).

Students are responsible for contacting Kokua Ike: Center for Student Learning to schedule an appointment. Verification of their disability will be requested through appropriate documentation and once received it will take up to approximately 2–3 weeks to review them. Appropriate paperwork will be completed by the student before notification will be sent out to their instructors. Accommodation paperwork will not be automatically sent out to instructors each semester, as the student is responsible to notify Kokua Ike via email at ada@chaminade.edu each semester if changes or notifications are needed.

7. Kōkua 'Ike: Tutoring & Learning Services

Chaminade is proud to offer free, one-on-one tutoring and writing assistance to all students. Tutoring and writing help is available on campus at Kōkua 'Ike: Center for Student Learning in a variety of subjects (including, but are not limited to biology, chemistry, math, nursing, English, etc.) from trained Peer and Professional Tutors. Please check [Kōkua 'Ike's](#) website for the latest times, list of drop-in hours, and information on scheduling an appointment. Free online tutoring is also available via TutorMe. Tutor Me can be accessed 24/7 from your Canvas account. Simply click on Account > TutorMe. For more information, please contact Kōkua 'Ike at tutoring@chaminade.edu or 808-739-8305.

8. Attendance Policy

Students are expected to attend regularly all courses for which they are registered. Student should notify their instructors when illness or other extenuating circumstances prevents them from attending class and make arrangements to complete missed assignments. Notification may be done by emailing the instructor's Chaminade email address, calling the instructor's campus extension, or by leaving a message with the instructor's division office. It is the instructor's prerogative to modify deadlines of course requirements accordingly. Any student who stops attending a course without officially withdrawing may receive a failing grade.

Unexcused absences equivalent to more than a week of classes may lead to a grade reduction for the course. Any unexcused absence of two consecutive weeks or more may result in being withdrawn from the course by the instructor, although the instructor is not required to withdraw students in that scenario. Repeated absences put students at risk of failing grades.

Students with disabilities who have obtained accommodations from the Chaminade University of Honolulu ADA Coordinator may be considered for an exception when the accommodation does not materially alter the attainment of the learning outcomes.

Federal regulations require continued attendance for continuing payment of financial aid. When illness or personal reasons necessitate continued absence, the student should communicate first with the instructor to review the options. Anyone who stops attending a course without official withdrawal may receive a failing grade or be withdrawn by the instructor at the instructor's discretion.

Tentative Course Outline:

Every effort has been made to ensure that the material in this syllabus is accurate and complete. The instructor reserves the right to make any changes in the contents of this syllabus that she deems necessary or desirable. Any changes will be announced in class and on Canvas.

Week	Date	Lecture Topic	Textbook Chapter	Assignments
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Part 1: How a neuron works						
1	1/13	Introduction & molecular biology review	1	Due 1/19		
	1/15	What are neurons?: fundamental neuron biology	2			
2	1/20	Biochemistry review & intro to our electric brains	3	Due 1/26		
	1/22	Resting potential	3			
3	1/27	Action potential: theory vs. reality	4	Due 2/2		
	1/29	Action potential cont.	4			
4	2/3	Synapses & neurotransmitters	5	Due 2/9		
	2/5	Synaptic integration	5			
5	2/10	Neurotransmitter systems	6	Study for exam 1!		
	2/12	Exam				
Part 2: Building and repairing the central nervous system						
6	2/17	Neuroanatomy: gross organization	7	Due 2/23		
	2/19	CNS structure through development	7			
7	2/24	Wiring the brain	23	Due 3/2		
	2/26	Chemical control of the brain	15			
8	3/3	Memory & synaptic plasticity	24,25	Due 3/9.		
	3/5	Spinal control of movement	13			
9	3/10	Brain control of movement	14	Study for exam 2!		
	3/12	Exam				
Spring Break 3/16-3/20						
Part 3: Feeling						
10	3/24	Taste & smell	8	Individual projects begin; 1st checkpoint due 3/30		
	3/26	No class, Prince Kūhiō day				
11	3/31	Seeing	9,10	Project cont.		
	4/2	Hearing	11			
12	4/7	Feeling: somatic sensation	12	2nd project checkpoint due 4/13		
	4/9	Feeling: motivation (aka food!)	16			
13	4/14	Feeling: sex!	17	Project cont.		

	4/16	Feeling: emotion	18	
14	4/21	Not-feeling: sleep	19	Study for exam 3! Final prep for project presentations
	4/23	Exam		
15	4/28	Presentations		Study for final!
	4/30	Final exam review		
Final	5/4	Final exam Monday 8:30am-10:30am		