

**University of Florida**  
**College of Public Health & Health Professions Syllabus**  
**SPA 6581 Electrophysiology (4 credits)**  
 Semester: Fall 2024  
 Delivery Format: On-Campus

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**Course Overview**

Theoretical and applied understanding of electrophysiology within the scope of audiology.

**Relation to Program Outcomes**

The content of this course is designed to provide students with both information and activities that apply to specific knowledge and skills set forth by the American Speech-Language-Hearing Association (ASHA) in regards to completion of academic and certification requirements in Audiology. Content will be learned from assigned readings, lectures, labs, and class discussions. Outcomes will be assessed through class discussions, labs, student reflections, and written examinations.

Governing Body	KASA Standard	Test
ASHA	Standard II-A: Foundations of Practice <ul style="list-style-type: none"> <li>• A1. Genetics, embryology and development of the auditory and vestibular systems, anatomy and physiology, neuroanatomy and neurophysiology, and pathophysiology of hearing and balance over the life span</li> <li>• A2. Effects of pathogens, and pharmacologic and teratogenic agents, on the auditory and vestibular systems</li> <li>• A3. Language and speech characteristics and their development for individuals with normal and impaired hearing across the life span</li> <li>• A4. Principles, methods, and applications of acoustics, psychoacoustics, and speech perception, with a focus on how each is impacted by hearing loss throughout the life span</li> <li>• A6. Standard safety precautions as well as cleaning/disinfection of equipment and of the clinic/facility in accordance with Centers for Disease Controls (CDC), facility-specific policies, and manufacturers' instructions to control for infectious/contagious diseases</li> </ul>	Tests*, In-Class Assignments**, Readings, Labs**

	<ul style="list-style-type: none"> <li>• A7. Applications and limitations of specific audiologic assessments and interventions in the context of overall client/patient management</li> <li>• A13. Principles of research and the application of evidence-based practice (i.e., scientific evidence, clinical expertise, and client/patient perspectives) for accurate and effective clinical decision making</li> <li>• A18. The role, scope of practice, and responsibilities of audiologists and other related professionals</li> </ul>	
ASHA	<p>Standard II-B: Prevention and Screening</p> <ul style="list-style-type: none"> <li>• B1. Educating the public and those at risk on prevention, potential causes, effects, and treatment of congenital and acquired auditory and vestibular disorders</li> <li>• B3. Participating in programs designed to reduce the effects of noise exposure and agents that are toxic to the auditory and vestibular systems</li> <li>• B5. Recognizing a concern on the part of medical providers, individuals, caregivers, or other professionals about hearing and/or speech-language problems and/or identifying people at risk to determine a need for hearing screening</li> </ul>	Tests*, In-Class Assignments**, Readings, Labs**
ASHA	<p>Standard II-C: Audiologic Evaluation</p> <ul style="list-style-type: none"> <li>• C1. Gathering, reviewing, and evaluating information from referral sources to facilitate assessment, planning, and identification of potential etiologic factors</li> <li>• C2. Obtaining a case history and client/patient narrative</li> <li>• C3. Obtaining client/patient-reported and/or caregiver-reported measures to assess function</li> <li>• C4. Identifying, describing, and differentiating among disorders of the peripheral and central auditory systems and the vestibular system</li> <li>• C11. Selecting, performing, and interpreting physiologic and electrophysiologic test procedures, including electrocochleography, auditory brainstem response with frequency-specific air and bone conduction threshold testing, and click stimuli for neural diagnostic purposes</li> <li>• C12. Selecting, performing, and interpreting otoacoustic emissions testing</li> <li>• C13. Selecting, performing, and interpreting tests for nonorganic hearing loss</li> <li>• C16. Electrophysiologic testing, including but not limited to auditory steady-state response, auditory middle latency response, auditory late (long latency) response, and cognitive potentials (e.g., P300 response, mismatch negativity response)</li> </ul>	Tests*, In-Class Assignments**, Readings, Labs**

ASHA	<p>Standard II-D: Counseling</p> <ul style="list-style-type: none"> <li>• D3. Facilitating and enhancing clients'/patients' and their families' understanding of, acceptance of, and adjustment to auditory and vestibular disorders</li> <li>• D8. Enhancing adherence to treatment plans and optimizing treatment outcomes</li> <li>• D9. Monitoring and evaluating client/patient progress and modifying counseling goals and approaches, as needed</li> </ul>	Tests*, In-Class Assignments**, Readings, Labs**
ASHA	<p>Standard II-E: Audiologic Rehabilitation Across the Life Span</p> <ul style="list-style-type: none"> <li>• E1. Engaging clients/patients in the identification of their specific communication difficulties and adjustment to them by eliciting client/patient narratives and interpreting self-reported and/or caregiver-reported measures</li> <li>• E2. Identifying the need for, and providing for assessment of, concomitant cognitive/developmental concerns, sensory-perceptual and motor skills, and other health/medical conditions, as well as participating in interprofessional collaboration to provide comprehensive management and monitoring of all relevant issues</li> <li>• E3. Responding empathically to clients'/patients' and their families' concerns regarding communication and adjustment difficulties to establish a trusting therapeutic relationship</li> <li>• E7. Developing and implementing individualized intervention plans based on clients'/patients' preferences, abilities, communication needs and problems, and related adjustment difficulties</li> <li>• E28. Ensuring treatment benefit and satisfaction by monitoring progress and assessing treatment outcome</li> </ul>	Tests*, In-Class Assignments**, Readings, Labs**
CAA	<p>3.1.2.A Foundations of Audiology Practice...each student can demonstrate knowledge of the...</p> <ul style="list-style-type: none"> <li>• embryology, anatomy, and physiology of the auditory, vestibular, and related body systems;</li> <li>• normal aspects of auditory and vestibular function across the lifespan;</li> <li>• effects and role of genetics in auditory function, diagnosis, and management of vestibular disorders;</li> <li>• effects of chemicals and other noxious elements on auditory and vestibular function;</li> <li>• effects of pathophysiology on the auditory, vestibular, and related body systems;</li> <li>• methods of biologic, acoustic, and electroacoustic calibration of clinical equipment to ensure compliance with current American National Standards Institute (ANSI) standards (where</li> </ul>	Tests*, In-Class Assignments**, Readings, Labs**

	<p>available) and other recommendations regarding equipment function;</p> <ul style="list-style-type: none"> <li>● principles and practices of research, including experimental design, evidence-based practice, statistical methods, and application of research to clinical populations</li> </ul>	
CAA	<p>3.1.3A Identification and Prevention of Hearing Loss, Tinnitus, and Vestibular Disorders...each student can learn and demonstrate knowledge and skills in...</p> <ul style="list-style-type: none"> <li>● the prevention of the onset of loss of auditory system function, loss of vestibular system function, development of tinnitus, and development of communication disorders;</li> <li>● the use of screening protocols, including clinically appropriate and culturally sensitive screening measures, to assess individuals who may be at risk for hearing impairment and activity limitation or participation restriction;</li> <li>● applying the principles of evidence-based practice;</li> <li>● selection and use of outcomes measures that are valid and reliable indicators of success of prevention programs</li> </ul>	<p>Tests*, In-Class Assignments**, Readings, Labs**</p>
CAA	<p>3.1.4A Assessment of the structure and function of the auditory and vestibular systems...each student can learn and demonstrate knowledge and skills in order to...</p> <ul style="list-style-type: none"> <li>● evaluate information from appropriate sources to facilitate assessment planning;</li> <li>● obtain a case history;</li> <li>● administer clinically appropriate and culturally sensitive assessment measures;</li> <li>● perform audiologic assessment using techniques that are representative of the challenges listeners may face in everyday communication situations;</li> <li>● perform assessment to plan for rehabilitation;</li> <li>● document evaluation procedures and results;</li> <li>● interpret results of the evaluation to establish type and severity of disorder;</li> <li>● generate recommendations and referrals resulting from the evaluation processes;</li> <li>● provide counseling in a culturally sensitive manner to facilitate understanding of the hearing loss, tinnitus, or balance disorder of the individual being served;</li> <li>● engage in interprofessional practice to facilitate optimal assessment of the individual being served;</li> <li>● assign the correct Common Procedural Terminology (CPT) code(s) and the correct International Classification of Diseases (ICD) code(s);</li> <li>● apply the principles of evidence-based practice;</li> </ul>	<p>Tests*, In-Class Assignments**, Readings, Labs**</p>

	<ul style="list-style-type: none"> <li>● select and use outcomes measures that are valid and reliable indicators of success in assessment protocols that are used.</li> </ul>	
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\*summative assessment, \*\*formative assessment

### Course Objectives

1. To describe appropriate electrophysiological instrumentation appropriately and consistent with the FDA and manufacturer guidelines and standards.
2. To describe test protocols for clinical electrophysiological measurements, including OAEs, ABR, ECoG, AMLR, and P300.
3. To describe the rationale and strategy for applying OAEs and ABR in the audiological assessment and management of children and adults.
4. To perform and analyze OAEs and ABRs appropriately.
5. To demonstrate knowledge of subject factors, including age, gender, race, and other aspects of diversity in the analysis and interpretation of auditory evoked responses.
6. To demonstrate knowledge of intra-operative neurophysiologic monitoring during surgeries putting the auditory system and/ or facial nerve at risk.

**Instructional Methods:** Lectures, labs, assigned readings, and class discussions

### Recommended Textbook:

Durrant, J. D., Fowler, C. G., Ferraro, J. A., & Purdy, S. C. (2022). *Basic Concepts of Clinical Electrophysiology in Audiology*. Plural Publishing.

*Other readings will be available on Canvas.*

Week	Date(s)	Topic(s)	Readings
1	8/26	Basic Concepts; Signals and Systems Essentials	pg. 1-43
1	8/28	Auditory Neurosensory Systems	pg. 49-82
2	9/2	<b>No Class – Labor Day</b>	
2	9/4	Auditory Neurosensory Systems	pg. 49-82
3	9/9	Stimulating the Auditory System	pg. 83-120
3	9/11	Evoking Responses of Peripheral Auditory System	pg. 121-176
4	9/16	Evoking Responses of Peripheral Auditory System	pg. 121-176
4	9/18	Lab: OAEs and ECOG	
5	9/23	Exam Review	
5	9/25	<b>Exam 1</b>	
6	9/30	Evoking Responses of the Auditory Brainstem	pg. 177-270
6	10/2	Evoking Responses of the Auditory Brainstem	pg. 177-270
7	10/7	Lab: ABR	
7	10/9	Lab: ASSR	
8	10/14	Testing Midbrain and Cortical Projection Pathways	pg. 271-312
8	10/16	Testing Midbrain and Cortical Projection Pathways	pg. 271-312
9	10/21	Lab: MLR	

Week	Date(s)	Topic(s)	Readings
9	10/23	Exam Review	
10	10/28	<b>Exam 2</b>	
10	10/30	Cortical Level Testing	pg. 313-364
11	11/4	Lab: P300	
11	11/6	Newborn Screening; Difficult-to-Test Patients	pg. 365-420
12	11/11	<b>No Class – Veteran’s Day</b>	
12	11/13	Testing Beyond Hearing Interests	
13	11/18	Case Study Presentations	
13	11/20	Case Study Presentations	
14	11/25	<b>No Class – Thanksgiving Break</b>	
14	11/27	<b>No Class – Thanksgiving Break</b>	
15	12/2	Exam Review	
15	12/4	<b>Exam 3</b>	

**Required student tasks/assignments:**

Labs will be graded for credit/no credit\*

\*(credit/no credit) means that if the assignment is satisfactory than “credit” will be given. However, if the assignment is not satisfactory than a “no credit” will be given which will result in points (-10%) off of your final grade for each assignment designated.

Exam 1 (30%)

Exam 2 (30%)

Exam 3 (30%)

Case Study (10%)

Labs (Credit/NC)

**Exam times and dates will not be altered:** In the event that the University is officially closed on a test day due to some unforeseen occurrence (e.g. inclement weather) the test will be given during the next regular class day. As you have been given the dates well in advance, you should be able to confidently schedule work hours, vacations, etc., so that they do not conflict with exam times.

**Lectures:** Website: e-Learning in Canvas, accessed via <http://elearning.ufl.edu/>

For technical support for this class, please contact the UF Help Desk at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)
- (352) 392-HELP - select option 2
- <https://kb.helpdesk.ufl.edu/FAQs/E-Learning>
- <https://lss.at.ufl.edu/help.shtml>

PowerPoint lectures, supplemental readings (outside the text), and lecture handouts will be provided through Canvas. All materials will be available prior to the lecture day. The student will be responsible for accessing and printing (if needed) all lecture materials.

**Supplemental Readings:** The course schedule indicates the dates that the readings should be completed.

**Lab Assignments:** The course schedule indicates the date that lab assignments are due. The assignments will be turned at the beginning of class on the due date. These will be Credit/No Credit meaning that there are no points for credit, but there can negative credit (up to -10%) for unsatisfactory work and/or no completion.

**Case Study:** Choose and present a disorder/pathology and its impact on electrophysiologic data. Presentations will be during class on the designated day in the topical outline. Presentations should be no longer than 10 minutes.

**Class Participation:** Participating in class discussions and class activities is expected.

Letter Grade	A	A-	B+	B	B-	C+	C	D+	D	D-	E
Percentage	93-100	90-93	87-89	83-86	80-82	77-79	70-76	67-69	63-66	60-62	<60
Points	925+	895-924	865-894	825-864	795-824	765-794	700-764	665-699	625-664	601-624	<600
Grade points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.33	1.0	0.67	0.0

For detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at:

<http://gradcatalog.ufl.edu/content.php?catoid=8&navoid=149>

### Expectations Regarding Course Behavior

You are expected to attend class and participate. Each class member has a different perspective and sharing provides a more meaningful exchange of ideas and interest. As a professional you will often be required to voice your opinion and perspective. Be respectful to the ideas of peers or the instructor if they differ from your own beliefs or experiences. You may use your laptop or tablet for class notes and class participation. Reviewing your e-mail, on-line shopping, completing other assignments or any other non-class related activity is disrespectful and distracting and you will be asked to remove yourself from class. Use of phones during class is unacceptable there will be ample breaks in class to attend to your personal calls or texts. If there is an impending emergency or pressing issue please discuss with me prior to the beginning of class.

### Academic Integrity

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

**“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”**

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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.”**

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:

<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>

<http://gradschool.ufl.edu/students/introduction.html>

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

### **Online Faculty Course Evaluation Process**

Students are expected to provide professional and respectful feedback on the quality of instruction in 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.a.a.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.a.a.ufl.edu/public-results/>.

### **Accommodations for Students with Disabilities**

If you require classroom accommodation because of a disability, it is strongly recommended you register with the Dean of Students Office <http://www.dso.ufl.edu> within the first week of class or as soon as you believe you might be eligible for accommodations. The Dean of Students Office will provide documentation of accommodations to you, which you must then give to me as the instructor of the course to receive accommodations. Please do this as soon as possible after you receive the letter. Students with disabilities should follow this procedure as early as possible in the semester. The College is committed to providing reasonable accommodations to assist students in their coursework.

### **Counseling and Student Health**

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The **Counseling and Wellness Center** 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. On line and in person assistance is available.
- **U Matter We Care** website: <http://www.umatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The **Student Health Care Center** at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>
- Crisis intervention is always available 24/7 from: Alachua County Crisis Center: (352) 264-6789 <http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>



- **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](#).

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

### **Inclusive Learning Environment**

- The UF Audiology Program, as well as this instructor, work to provide a safe and respectful environment in which students can learn independently as well as cooperatively. Furthermore, ASHA and AAA Ethics require us to always interact with our patients and each other in professional manners. It is possible to have differing opinions or beliefs yet interact in a respectful manner towards your patients and/or colleagues. Therefore, it is the expectation of the instructor that you will facilitate a positive learning environment during class. Students that deliberately and specifically make the learning environment toxic, either by word, action, attitude, or behavior may be asked to leave the class, earn a grade of “zero” for that day’s activity, and/or be referred to the Dean of Students for harassment.
- Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious and political values. We further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida’s Non-Discrimination Policy, which reads, “The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans’ Readjustment Assistance Act.” If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see your instructor or refer to the Office of Multicultural & Diversity Affairs website: [www.multicultural.ufl.edu](http://www.multicultural.ufl.edu)