

Last name of instructor (Semester Year)

**California State University, Sacramento**  
**IMPLANTABLE DEVICES AND TECHNOLOGY**  
CSAD662 - 2 units  
Summer 2021 (AUD-2)

**COURSE FACULTY**

**Course Instructor:**  
**Folsom Hall office #:**  
**Office Phone:**  
**Office Hours:**  
**E-mail address:**

**REQUIRED CLASS MEETINGS TIMES**

Days and times:  
Building: Folsom      Room #:

**REQUIRED TEXTS**

Ruckenstein, M.J. (2012). *Cochlear implants and other implantable hearing devices*. Plural Publishing.

Wolfe, J., & Schafer, E. (2014). *Programming cochlear implants* (2<sup>nd</sup> ed.). Plural Publishing.

**OPTIONAL TEXTS**

**COURSE WEBSITE**

<https://sacct.csus.edu>

SacCT will be used as the learning management site for dissemination of course readings, handouts, slides, assignments, announcements, and tests/quizzes. The course faculty will have materials posted to SacCT at least 48 hours before class.

**Instructor Communication and Response Time**

Faculty strive to have open communication with students both within and outside of the classroom. Students are encouraged to contact faculty to discuss questions about the course. Responses to telephone or e-mail messages will usually be transmitted within 48 hours during regular working hours. If you do not have a response within this time period, please check your contact methods and resend the message. Faculty will generally respond to student questions received during evenings and weekends once they are back in the office during regular business hours.

**\*Please be aware that all content for this course is the property of the course faculty who have created it and can only be used for this course. Those wishing to use the materials outside of this course must receive written permission from the author/creator.**

**GENERAL COURSE INFORMATION**

**PRE-REQUISITES**

Admission to Doctor of Audiology program; CSAD611, CSAD612, CSAD613, CSAD614, CSAD621, CSAD622, CSAD622L, CSAD623, CSAD624, CSAD631, CSAD632, CSAD641, CSAD641L, CSAD642, CSAD643, CSAD651, CSAD652, CSAD653

## COURSE DESCRIPTION

### Overview

This course presents information related to the functioning of a cochlear implant, candidacy requirements in the United States, evaluation and validation, and parameters for programming. Students will also learn about the surgical process, which will be observed through CSAD655 Medical Observation, and the benefits and limitations for cochlear implants in children and adults.

### Approved Course Description (from CSUS Course Catalog)

Pre-operative assessment and post-operative management of cochlear implants and other implantable devices. Includes patient counseling for expectations, introduction to surgical procedures, mapping, use of assistive devices, and current developments in research.

### WHY IS THIS COURSE IMPORTANT?

For individuals with severe to profound hearing loss or conductive or mixed hearing losses, implantable technology can be used to improve communication and quality of life. Audiologists are involved in various stages of the process, from evaluation, pre- and post-operative assessments, fitting, and rehabilitation.

### UNIVERSITY LEARNING GOALS

	1 Disciplinary knowledge	2 Communication	3 Critical thinking/analysis	4 Information literacy	5 Professionalism	6 Intercultural/global perspectives	7 Research
Addressed by this course	X	X	X	X	X		X

### GRADUATE LEARNER OUTCOMES

Mastery of each student-learning outcome listed below is indicated by a grade of B or better on each component of the corresponding measures listed in the table. Students are required to track their progress towards meeting each learning outcome and must make an appointment with the instructor for any grade equal to or less than a B. The instructor will suggest strategies to help you establish competence and knowledge in these areas.

Students should track their progress towards meeting each learning outcome by listing their grades on the table below over the course of the semester.

Upon completion of this course, students will be able to:

1. Outline the historical developments in implantable technology for hearing impairment
2. Describe candidacy requirements for a cochlear implant in pediatric and adult populations, including federal regulations, contraindications, and audiologic and medical assessments
3. List the major components of a cochlear implant, bone-anchored hearing aid, and middle-ear implant
4. List the professionals typically involved in pediatric and adult cochlear implant teams
5. Compare and contrast the three major cochlear implant manufacturers, including programming, electrodes, electrode arrays, dimensions, depth of implantation, casing, magnets, sound processors, dynamic range, user controls, accessories, and battery life
6. Describe verification and validation procedures for implantable devices
7. Outline mapping procedures for cochlear implants
8. Summarize surgical procedures for cochlear implants, bone-anchored hearing aids, middle-ear implants, and auditory brainstem implants

Graduate Learner Outcome	Component Indicating Competence	Grade(s) Received
1-8	Exam (100%)	
1-4,6-8	Quiz (100%)	
5	Implant Manufacturer Project (100%)	

## **COURSE/CLASS POLICIES**

### **Course Format**

Lecture

### **Class Preparation:**

All required readings are for the date listed in the course schedule, not the following class period. Students are responsible for all assigned readings, whether discussed in class or not.

### **Class Participation:**

Students are expected to actively participate in class discussions and are required to have read the assigned material prior to class meetings.

### **Class Attendance:**

Classroom attendance is necessary for this course. No more than three unexcused absences are allowed. Students are expected to arrive on time as class begins at X:XX am/pm.

### **Class Assignments**

Course grades will be based on ten quizzes, a cochlear implant manufacturer project, two exams, and one final exam.

### **Implant Manufacturer Project**

Students will create a table that compares three major cochlear implant manufacturers (Advanced Bionics, Cochlear, and Med-EL). Examples of major categories include: channels, stimulation rates, length of electrode arrays, casings, sound processors, accessories, microphone placements, data logging, and battery life.

### **Quizzes**

Weekly quizzes will be available on SacCT one week prior to the due date. Students are expected to complete the quiz before the scheduled due date. Quizzes are based on assigned reading. Students will have 60 minutes to take the quiz; late submissions will receive a 0.

### **Exams**

- **Exam absences:** No make-up examinations will be given unless there is a documented emergency for which you have written proof. Any approved make-up exams will be scheduled at the end of the semester (during finals week) and may be administered in a different format from the original exam.
- **Exam procedures:**

Test arrival/start

Test duration and completion

### **Commitment to Integrity**

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As a student in this course (and at this university) you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class and also integrity in your behavior in and out of the classroom.

### **Sac State's Academic Honesty Policy & Procedures**

"The principles of truth and honesty are recognized as fundamental to a community of scholars and teachers. California State University, Sacramento expects that both faculty and students will honor these principles, and in so doing, will protect the integrity of academic work and student grades." Read more about Sac State's Academic Honesty Policy & Procedures at the following website: <http://www.csus.edu/umannual/AcademicHonestyPolicyandProcedures.htm>

*Definitions:* At Sac State, "cheating is the act of obtaining or attempting to obtain credit for academic work through the use of any dishonest, deceptive, or fraudulent means."

"Plagiarism is a form of cheating. At Sac State, "plagiarism is the use of distinctive ideas or works belonging to another person without providing adequate acknowledgement of that person's contribution." *Source:* Sacramento State University Library

*Note:* Any form of academic dishonesty, including cheating and plagiarism, shall be reported to the office of student affairs.

### **Understand When You May Drop This Course**

It is the student's responsibility to understand when he/she need to consider disenrolling from a course. Refer to the Sac State Course Schedule for dates and deadlines for registration. After this period, a serious and compelling reason is required to drop from the course. Serious and compelling reasons include: (a) documented and significant change in work hours, leaving student unable to attend class, or (b) documented and severe physical/mental illness/injury to the student or student's family. Under emergency/special circumstances, students may petition for an incomplete grade. An incomplete will only be assigned if there is a compelling extenuating circumstance. All incomplete course assignments must be completed in accordance with the department's policy.

### **Accommodations**

Inform your instructor of any accommodations needed. If you have a documented disability and verification from the Office of Services to Students with Disabilities (SSWD), and wish to discuss academic accommodations, please contact your instructor as soon as possible. It is the student's responsibility to provide documentation of disability to SSWD and meet with a SSWD counselor to request special accommodation before classes start. SSWD is located in Lassen Hall 1008 and can be contacted by phone at [\(916\) 278-6955](tel:9162786955) (Voice) or [\(916\) 278-7239](tel:9162787239) (TDD only) or via email at [sswd@csus.edu](mailto:sswd@csus.edu)

### **Course Requirement Grading**

<b><u>Activity</u></b>	<b><u>Points Available</u></b>
Quizzes (10 points x 10)	100
Cochlear implant manufacturer project	150
Exam (date and material covered)	200
Exam (date and material covered)	200
Final exam (date and material covered)	250
<b><u>TOTAL COURSE POINTS AVAILABLE</u></b>	900

### **Overall Percentage Needed**

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Note: A grade of "B" or higher is required to count toward the minimum number of units needed to advance to candidacy.

Grade	Percentage
A	93-100%
A-	90-92%
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	< 60%

### COURSE SCHEDULE OF LECTURE TOPICS AND EXAMS

Date	Topic and Activity or Quiz and Exam	Readings/ Assignment
5/30	Introduction to course	
6/4	History of amplification and implantable technology	Ruckenstein- Ch. 1-2
6/6	Cochlear implant components	Wolfe & Schafer- Ch. 1
6/6	Candidacy for cochlear implants	Wolfe & Schafer- Ch. 1 Ruckenstein- Ch. 5
6/11	Candidacy for cochlear implants, children	Ruckenstein- Ch. 5
6/13	Evaluation Electrodes	Ruckenstein- Ch. 3
6/18	Cochlear implant programming	Wolfe & Schafer- Ch. 2-3
6/20	CI team, medical and surgery	Ruckenstein- Ch. 6-8
6/25	<b>Exam 1</b>	
6/27	MedEL	Wolfe & Schafer- Ch. 6
7/2	Advanced Bionics	Wolfe & Schafer- Ch. 4
7/4	Cochlear	Wolfe & Schafer- Ch. 5
7/9	Adult outcomes	Wolfe & Schafer- Ch. 8 Ruckenstein- Ch. 15
7/11	Pediatric habilitation	Ruckenstein- Ch. 14
7/16	Language development and outcomes with CIs	Ruckenstein- Ch. 14
7/18	<b>Exam 2</b>	
7/23	Validation Speech perception testing	Spahr, A.J. et al (2012). Development and validation of the AzBio sentence lists. <i>Ear &amp; Hearing</i> , 33(1), 112-117.
7/25	Validation	Ruckenstein- Ch. 17
7/30	Bimodal fittings	Litovsky, R.Y., Johnstone, P.M., & Godar, S.P. (2009). Benefits of bilateral cochlear implants and/or hearing aids in children. <i>International Journal of</i>

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		<i>Audiology, 45 (Suppl 1), 78-91.</i>
8/1	Hearing assistive technology	Wolfe & Schafer- Ch. 9
8/6	Bone-conduction hearing devices	Hol et al. (2005). Long-term results of bone-anchored hearing aid recipients who had previously used air-conduction hearing aids. <i>JAMA Otolaryngology-Head &amp; Neck Surgery, 131(4), 321-325.</i>
8/8	Bone-anchored hearing aids Surgery	Ruckenstein- Ch. 19-20
8/13	Middle ear implants	Ruckenstein- Ch. 21
8/15	Middle ear implants	Ruckenstein- Ch. 21
8/19	Auditory brainstem implants	Ruckenstein- Ch. 18
8/21	<b>Final exam</b>	

Please note that dates, topics, and assignments are subject to change. In the event of a change, you will be given ample notification of the change.

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