

Last name of instructor (Semester Year)

California State University, Sacramento

GENETICS FOR AUDIOLOGY

CSAD624 - 1 unit
Spring 2020 (AUD-1)

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

Toriello, H.V., & Smith, S.D. (2013). *Hereditary hearing loss and its syndromes* (3rd ed.). Oxford University Press.

OPTIONAL TEXTS

Shprintzen, R.J. (2004). *Syndrome identification for audiology: An illustrated pocketguide*. Singular Publishing.

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

COURSE DESCRIPTION

Overview

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This course introduces students to the basics of genetics, including modes of inheritance, mutations, and causes of hearing loss. Focus will be on syndromic and non-syndromic causes of hearing and balance disorders.

Approved Course Description (from CSUS Course Catalog)

Introduction to genetics, inheritance, and causes of hearing loss and balance disorders.

WHY IS THIS COURSE IMPORTANT?

More than half of hearing loss in newborns is due to genetic (non-syndromic and syndromic) causes. Understanding mechanisms of inheritance and mutations that lead to non-syndromic and syndromic causes of hearing loss is important for obtaining case histories, diagnosing hearing loss, and managing hearing loss.

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 |

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. Describe the basic concepts of genetics
2. Construct a pedigree chart
3. Describe Mendelian inheritance
4. Describe the chromosomal basis of inheritance
5. Distinguish between different mechanisms of transmission
6. Differentiate between mitosis and meiosis
7. Differentiate between DNA and RNA and their respective transcriptions
8. Explain structural mutations and their relation to inheritance
9. Discuss ethical issues and controversies with genetic testing
10. List syndromic and non-syndromic causes of hearing loss and deafness

| Graduate Learner Outcome | Component Indicating Competence | Grade(s) Received |
|--------------------------------|---------------------------------|-------------------|
| 1,3-10 | Exam (100%) | |
| 1,3-10 | Quizzes (100%) | |
| 2 | Pedigree 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 pedigree project, and three exams.

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.

Pedigree Project

Students will construct a pedigree for a given disorder and inheritance.

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

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."

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“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 [\(916\) 273-7239](tel:9162737239) (TDD only) or via email at sswd@csus.edu

Course Requirement Grading

| <u>Activity</u> | <u>Points Available</u> |
|---|--------------------------------|
| Quizzes (10 points x 10) | 100 |
| Pedigree project | 50 |
| Exam (date and material covered) | 200 |
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| <u>TOTAL COURSE POINTS AVAILABLE</u> | 750 |

Overall Percentage Needed

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% |

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F

< 60%

COURSE SCHEDULE OF LECTURE TOPICS AND EXAMS

| Date | Topic and Activity or Quiz and Exam | Readings/ Assignment |
|------|---|---|
| 1/20 | Introduction to course History of genetics | Toriello & Smith- Ch. 1 |
| 1/27 | Introduction to biology | Toriello & Smith- Ch. 2 Quiz 1 due |
| 2/3 | Introduction to human genetics Chromosomes Karyotypes | Quiz 2 due |
| 2/10 | Chromosomal abnormalities Inheritance Punnett squares activity | Toriello & Smith- Ch. 17 Quiz 3 due |
| 2/19 | Embryology Mutations-environment, medication | Toriello & Smith- Ch. 3-4 Quiz 4 due Pedigree due |
| 2/26 | Exam 1 | |
| 3/2 | Hearing impairment and genetics | Dror, A.A., & Avraham, K.B. (2010). Hearing impairment: A panoply of genes and functions. <i>Neuron</i> , 68(2), 293-308. |
| 3/9 | DNA helix, structure Transcription | Quiz 5 due |
| 3/16 | RNA Genetic testing | Quiz 6 due |
| 3/23 | Genetic counseling, ethics Testing for causes of deafness | Arnett, J., Emery, S.B., Kim, T.B., Boerst, A.K., Lee, K., Leal, S.M., & Lesperance, M.M. (2011). Autosomal dominant progressive sensorineural hearing loss due to a novel mutation in the KCNQ4 gene. <i>Archives of Otolaryngology-Head & Neck Surgery</i> , 137(1), 54-59. Quiz 7 due |
| 4/1 | Exam 2 | |
| 4/8 | Syndromic causes of hearing loss | Shearer AE, Hildebrand MS, Smith RJH. Hereditary Hearing Loss and Deafness Overview. 1999 Feb 14 [Updated 2017 Jul 27]. In: Adam MP, Ardinger HH, Pagon RA, et al., editors. GeneReviews® [Internet]. Seattle (WA): University of Washington, Seattle; 1993-2018. Available from: https://www.ncbi.nlm.nih.gov/books/NBK1434/ |
| 4/15 | Outer ear, ocular, renal disorders Musculoskeletal and cardiac disorders | Quiz 8 due Toriello & Smith- Ch. 9-14 Quiz 9 due |

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| 4/22 | Cleft palate/lip Autism spectrum disorder | Toriello & Smith- Ch. 16 |
| 4/29 | Gene therapy | Gao et al. (2018). Treatment of autosomal dominant hearing loss in vivo delivery of genome editing agents. <i>Nature</i> , 553, 217-221. Quiz 10 due |
| 5/4 | Exam 3 | |

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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