Human Genetics | Lecture and Lab

Academic Year 2020-2021

Course Information

Course Numbers	Total Credits	Time Requirement
GEN331/GEN331L	**4 (3 Lecture + 1 Lab)**	**75 hrs (Lecture 45hrs + Lab 30hrs)**

Course Details

Recommended Prerequisites

High School Diploma or equivalent; General Biology I and II are highly recommended

Course Description

This course will address the study of mechanisms of traits inheritance and genetic variety in humans. This will require an understanding of Mendelian genetics rules and its extensions, cellular genetics and chromosomal mutation, molecular genetics and analysis of replication, transcription, and translation, and a closer look at cancer, as well as analysis of genetics aspects of health and wellness areas like cancer and biotechnology, evolutionary genetics, genetics and populations and a brief review of ethics in genetics.

Lecture and Laboratory Communication

A website will be set up on Canvas by your instructor.
Log in with your Username and password: **https://scuhs.instructure.com**

Faculty Information

Refer to the Canvas course webpage for this information.

Class Meeting Times

Refer to Canvas course webpage for this information.

Instructional Materials

Required Text(s)

Lecture**:** Human Genetics: Concepts and Applications by Lewis, 12th ed. ISBN-13: 978-1259700934

Lab

SCU Human Genetics Laboratory Manual (available on Canvas)

Provided Materials: PPE (Personal Protection Equipment): UVEX goggles, gloves, and flame-resistant lab coat.

Required Attire: Close-toed shoes, professional attire and lab coats are mandatory during all lab hours. No shorts, heels, or flip-flops will be allowed in the laboratory; hair longer than shoulder-length must be pulled back and held with a clip or hair tie. Gloves, goggles, and additional safety equipment will be required per experiment.

SOUTHERN CALIFORNIA UNIVERSITY OF HEALTH SCIENCES

Course Purpose

Student Learning Outcomes

At the conclusion of this course, a successful student should be able to:

1. Absorb Mendelian genetics, its extensions, and postulates.
2. Understand chromosome mapping.
3. Differentiate between sex chromosomes and sex determination.
4. Examine various forms of chromosomal mutation.
5. Deepen understanding of DNA replication, transcription, and translation.
6. Comprehend cancer on a mechanistic level.
7. Analyze the biotechnology and ethical aspects of genetic applications.

Course Schedule

(subject to slight modifications by the instructor)

Day	Lecture	Assessment
1	Introduction and Mendelian Genetics: • Deepen understanding of mitosis, meiosis, and the cell cycle. • Mendelian genetics and its extensions.	Class Participation
2	Introduction and Mendelian Genetics: • Perform Punnett squares and solve genetic problems. • Analyze pedigrees.	Quiz 1
3	Cellular Genetics and Chromosomes: • Comprehend chromosome mapping in eukaryotes. • Understand how sex determination occurs.	Quiz 2
4	Cellular Genetics and Chromosomes: • Observe a variety of chromosomal mutations. • Examine extranuclear inheritance.	Exam 1
5	Molecular Genetics: • Review DNA and RNA structure. • Deepen understanding of replication, transcription, and translation.	Quiz 3
6	Molecular Genetics: • Broaden knowledge of chromosomal organization. • Absorb methods of regulation of gene expression.	Exam 2

Day	Lecture	Assessment
7	Cancer and Biotechnology: • Comprehend the mechanisms of cancer. Familiarize oneself with stem cells and their utility. • Consider various forms of biotechnology and assess their ethics.	Quiz 4
8	Population Genetics and Evolution: • Introduction to statistical analysis of polygenic traits.	Exam 3
9	Population Genetics and Evolution: • Genetic basis of behavior and evolution in populations of species. • Conservation genetics and species survival.	Class Participation
10	**Review and Final Exam**	**Exam 4**

Tentative Grading Procedures

Lecture

Assessment	Points
Quizzes	80
Exam 1	40
Exam 2	40
Exam 3	40
Exam 4	50
Total	250

Lab Schedule

(subject to slight modifications by the instructor)

Day	Laboratory	Assessment
1	1) Mendelian genetics	Lab notebook
	2) The Cell Cycle and Mitosis	Lab notebook
2	3) Meiosis & Sexual Reproduction	Lab notebook
	4) Patterns of inheritance	Lab notebook
3	5) Punnet Squares Activity	Lab notebook
	6) Human Karyotyping	Lab notebook

Day	Laboratory	Assessment
4	7) Human Blood Typing	Midterm Exam
	8) Gender Determination	Lab notebook
5	9) DNA Replication & Gene Expression	Lab notebook
	*Video and Ethical dilemma discussion on genetic engineering.	Lab notebook
6	10) DNA Extraction	Lab notebook
	11) DNA scissors	Lab notebook
7	10) DNA Extraction	Lab notebook
	11) DNA scissors	Lab notebook
8	14) Genetic Linkage	Lab notebook
	15) Population Genetics	Lab notebook
9	Review	
10	Lab Final	Lab Final

Tentative Grading Procedures

Lab

Assessment	Weight
Lab Notebook	20
Lab Midterm	30
Lab Final	30
Participation	20
Total	100

Grading scale:

Please note letter grades will be assigned only at the end of the trimester.

A = 90% to 100%

B = 80% - less than 90%

C = 70% - less than 80%

D = 60% - less than 70%

F = less than 60%

W = Withdrawal

Grading procedures:

The format of assessments may include multiple choice, short answer, labelling, fill-in-the-blank, or matching examinations. Participation points are required and will be assigned by the instructor as the course progresses using any of the following: in class mini quizzes, activities, online quizzes. For online quizzes students must have a phone, tablet, laptop or other internet connected device to participate. Students must be in class during the participation activities to receive participation marks.

Academic Integrity

Visit SCU's **Academic Integrity** page to review policies for professionalism and academic integrity.

Teaching Methods and Activities

The course requires a significant time commitment from students. This commitment is both in terms of reading lecture outlines prior to reading the chapters, as well as reviewing the material.

Required Attire

Close-toed shoes, professional attire and lab coats are mandatory during all lab hours. No shorts, heels, or flip-flops will be allowed in the laboratory; hair longer than shoulder-length must be pulled back and held with a clip or hair tie. Gloves, goggles and additional safety equipment will be required per experiment.

Classroom Expectations

Please be professional, prompt, prepared, and polite always.

The professor will adhere to all policies as found in the Student Handbook. Cellular phones must be kept on silent during class and lab times. Students may not use a phone as a calculator. As a safety precaution, no food or drinks are allowed inside the lab, but there will be a designated break for eating and drinking outside of the lab.

University Policies

Accommodations

As a learning-centered community, Southern California University of Health Sciences recognizes that all students should be afforded the opportunity to achieve their academic and individual potential. The University recognizes and supports the standards set forth in Section 504 of the Rehabilitation Act and

the American with Disabilities Act (ADA). In accordance with its mission and federal and applicable state laws, the University is committed to making reasonable accommodations for qualified applicants for admission and enrolled students with disabilities. A student who needs accommodation(s) due to a disability should contact the Academic Support Office located in the Learning Resource Center.

Faculty and Dr./Patient Relationships

SCU faculty are highly skilled. However, per University Policy, health care is offered to students through the University Health System only. Neither preclinical nor clinical faculty can provide advice, assessment, treatment, or other elements that would be considered part of a Doctor-Patient relationship outside of a clinical setting established for that purpose.

Learning Activities

Students are expected to spend at least two hours for each lecture hour of course time per week in activities and assessments outside the classroom. Examples of activities include but are not limited to writing papers; reading

articles or text; small group work; presentations; completing assignments; preparation for assessments; online activities and other activities that do not include direct instructor interaction and involvement.

All university policies apply to this course and all others. For full policy information please consult the university SCU Policy Manual. For a quick reference guide to the following policies: make-up examination, F-challenge examination, grade posting, results of failing grades, student support information, syllabus amendments, special needs, student conduct, and attendance, please consult the academic policies document housed on the **Online Student Services .**