

USC Dornsife
College of Letters,
Arts and Sciences

**HBIO370 – Genetics and Diseases (4 units)
Spring 2024**

Lecture: Tue/Thu 12:30-1:50

Location: SLH 102

Lecture Instructor: Gioia Polidori, PhD

Contact Info: gpolidor@usc.edu

Office: AHF B40

Office Hours: Tue & Thu 11:30-12:30 pm in AHF 251 and Fri 11:00-1pm on zoom (link on Brightspace).
Fri 2:30-4pm online – this session is flexible, so we can arrange a different time as long as we plan it ahead of time and I can notify the class.

Lab Instructor Contact Info:

Lisa Lê - Lelisa@usc.edu

Discussions:

Section number 38410R

Time 3:30-4:20 p.m.

Day Tuesday

Location PED 203

Section number 38460R

Time 10:00-10:50 p.m.

Day Thursday

Location PED B7

Section number 38510R

Time 11:00-11:50 p.m.

Day Thursday

Location PED B7

Course Description

The course provides an overview of the genetic underpinning of human health and disease. Topics include, but are not limited to the inheritance of mendelian diseases, common diseases, developmental disease and cancer as well as prenatal testing, genetic counseling and genetic therapies.

I. Prerequisite: BISC 220.

II. Required Text:

Emery's Elements of Medical Genetics, 15th edition. Peter Turnpenny and Sam Ellard.

III. Learning Objectives

- Describe the structure and function of genes and chromosomes as well as their organization

in the human genome

- Apply genetic principles to explain the inheritance of selected mendelian and multifactorial human diseases
- Integrate and apply concepts in anatomy, physiology, pathology and genetics to solve case studies through independent study and self-directed group projects
- Solve various inheritance, pedigree and epidemiology problems applying probability concepts and Bayes' theorem
- Discuss and analyze how genetic variation, together with environmental factors, contribute to the naturally occurring manifestations of human diversity
- Use relevant sources of scientific evidence to construct a well-supported, logical argument and apply it for the resolution of ethical and sociocultural issues as they relate to human genetics

IV. Description and Assessment of Assignments

- Class material will be evaluated via quizzes, case studies and exams.
- Problem-based learning activities will entail the use of case studies to apply the knowledge acquired in class to solving real world problems. Each week students will work on a case study in groups and submit their answers on blackboard for grading.
- Quizzes will be given during lectures and will be based on the material discussed as a way to promote interactive learning.
- Debates will address issues concerning genetic testing. Students will work in groups so that each student will participate in one debate. Depending on enrollment, the duration and student distribution in debate projects will vary.

V. Grading Breakdown

Assignment	% of Grade
Midterm 1	25
Midterm 2	25
Final Exam	25
Case Studies	15
Debate	5
Quizzes	5
TOTAL	100
JEP (Extra Credit)	2.5

VI. Grading Scale

- The grading scale is based on the traditional scale as follows:

	A (≥93%)	A- (≥90%)
B+ (≥87%)	B (≥83%)	B- (≥80%)
C+ (≥77%)	C (≥73%)	C- (≥70%)
D+ (≥67%)	D (≥63%)	D- (≥60%)
F (≤59.9%)		

Tentative Lecture Schedule

Date	Lecture Topic	Chapter	Case Study

Jan. 14	Introduction		No discussion
Jan. 16	Molecular Basis of Genetics I	2	
Jan. 21	Molecular Basis of Genetics II	2	Karyotype
Jan. 23	Basis of Inheritance	3	
Jan. 28	Patterns of Inheritance	6	Duchenne
Jan. 30	Risk Calculation	8	
Feb. 4	Population Genetics	7	Alzheimer's
Feb. 6	Genetic Problems	7	
Feb. 11	Pedigree Analysis	8	Cystic Fibrosis
Feb. 13	Pedigree Analysis & Risk Calculation	7-8	
Feb. 18	<i>Review</i>		CML
Feb. 20	Midterm I		
Feb. 25	Diseases of Hemoglobin I	12	Celiac Disease
Feb. 27	Diseases of Hemoglobin II	12	
Mar. 4	Immunogenetics	13	Anemia
Mar. 6	Genetics of Common Diseases	10	
Mar. 11	Genetics of Cancer	14	Debate Check in
Mar. 13	Personalized Medicine	15	
Mar 18	Spring Recess		
Mar. 20	Spring Recess		
Mar. 25	Inborn Errors of Metabolism	18	Albinism
Mar. 27	<i>Review</i>		
Apr. 1	Midterm II		Achondroplasia
Apr. 3	Development	9	
Apr. 8	Congenital Abnormalities	16	Neural Tube Defects
Apr. 10	Differences in Sex Development	16	
Apr. 15	Chromosome Disorders	17	DSD
Apr. 17	Monogenic Disorders	19	
Apr. 22	Atypical Modes of inheritance	slides	Debate I
Apr. 24	Prenatal Testing	20	
Apr. 29	Genetic Counseling	21	Debate II
May 1	<i>Review</i>		
	<i>Study Days</i>		
	<i>Final Exam: see schedule of classes</i>		

VII. Additional Policies

- A midterm exam can be taken after the specified date ONLY if the student has a documented excuse.

- A request to take a make-up exam must be accompanied by evidence of necessity (e.g.: athlete excuse form or interview notice) and must be made before the date of the scheduled exam.
- Lecture slides will be posted on blackboard, however, please do not rely entirely on slides, these are meant as a starting point for note-taking. Class notes and textbook information will form the basis of the material that will be on the exams. If you attend class regularly, you will be updated on the status of lecture notes and course material/announcements.
- Quiz submission: **quizzes are in-class activities** so will only be available during class time for students present in class. Students who have to miss class should notify the instructor to request an exemption. **Submitting quizzes when not present in class will be considered an violation of academic integrity and will be reported to OAI.**
- The only extra credit offered for this course is JEP. This is a semester-long commitment and you will receive extra credit in the class based on your performance in the program. JEP is the oldest and largest university service-learning program in the country. It offers students the unique opportunity to combine academic coursework with experiences in the community surrounding the campus. JEP assignments will be relevant to the course content and unique to HBIO 370. At the beginning of the semester, a JEP representative will visit our class and tell you more about the program. Deadline for registration is usually during the first two weeks of classes so make sure you register on time and notify the instructor. JEP assignments must be completed before the scheduled final examination. To register for JEP, visit <http://dornsife.usc.edu/joint-educational-project/>.
- Grades will not be rounded. A final grade of 89.99% will NOT be reflected as an A-. It is always difficult to miss a grade boundary by a small amount, but rounding up would defeat the purpose of having an objective grading scale.
- Science and the Evolving Language - As our understanding of science is constantly evolving, so are the terms used in scientific discussions. Therefore, there are terms and concepts that are in the process of being updated by the scientific community but remain outdated, and do not reflect our current values of equity or inclusivity (e.g., the word obesity or that current medical nutritional guidelines utilize a binary dichotomy of men vs women). Despite our own personal values and beliefs, such terms and concepts are part of a global science curriculum and thus will be covered in this class in order to best prepare students professionally. We acknowledge the fact that terms and concepts are in the process of being updated to better reflect our evolving understanding of science and humanity, and hope that you and your colleagues will continue to advocate for and build an equitable academic community in your classrooms and beyond.
- Academic Dialogue: The foundations of academic learning are rooted in our capacity to listen to each other, learn from each other, and respect each other, particularly when we disagree with each other. Academic dialogue is not about winning, but about learning together. To facilitate our building of a robust academic community in this class, we will be creating a living document of

norms and expectations of engagement for respectful dialogue.

- **Use of Generative Artificial Intelligence**
Since creating, analytical, and critical thinking skills are part of the learning outcomes of this course, all assignments should be prepared by the student working individually or in groups. Students may not have another person or entity complete any substantive portion of the assignment. Developing strong competencies in these areas will prepare you for a competitive workplace. Therefore, using AI-generated tools is prohibited in this course, will be identified as plagiarism, and will be reported to the Office of Academic Integrity.

VIII. Academic Conduct & Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on Research and Scholarship Misconduct.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University’s educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086
eetix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776
osas.usc.edu
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.
USC Campus Support and Intervention - (213) 821-4710
campussupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
ombuds.usc.edu
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-3340 or otfp@med.usc.edu
chan.usc.edu/otfp

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.