

Molecular Biology - BISC 320L

Draft Syllabus for Fall 2022

Lectures are in THH 101: MWF 11:00 a.m.-11:50 a.m., and MWF 12:00 p.m.-12:50 p.m.

Instructors: Oscar Aparicio, Ph.D., Professor (oaparici@usc.edu)
Nancy Castro, Ph.D., Associate Professor (Teaching) (ncastro@usc.edu)
Eric Noakes, Instructional Laboratory Manager (enoakes@usc.edu)

Office hours: Aparicio M, F 2:00-4:00 PM, or by appointment
Castro Th 1:00-2:00 PM, F 9:30-10:30, or by appointment

Textbook: Molecular Biology – Principles of Genome Function, Craig et al., 2nd or 3rd edition

Readings from the text or other sources are assigned on the lecture schedule. It is important to read the assignments prior to the corresponding lectures.

The course grade will be based upon **400** possible points:

100 pts Midterm #1
100 pts Midterm #2
100 pts Lab
100 pts Final Exam (non-cumulative)

There is no extra credit offered for the course. Final letter grades are assigned on a curve, determined entirely by the total number of points earned on lecture exams and in the laboratory portion of the course. *No make-up exams will be given in this course.* If you miss a midterm due to illness, you must present a valid medical excuse to Mr. Noakes, the Instructional Lab Manager, within one week of the missed exam. If you have a valid excuse, your exam score will be determined by prorating scores of the remaining two exams. Rules governing exams are given in more detail in your Student Contract, which is also posted on the class website: <https://blackboard.usc.edu>

Lab Sections: See separate syllabus and lab manual.

Learning Objective: An understanding at a molecular level of the most fundamental processes of cellular life in terms of the genetic material, its expression, duplication, and maintenance. The student will learn the structure and function of biological macromolecules, in particular nucleic acids (DNA and RNA) and proteins and how these molecules act to copy, express and accurately transmit genetic information. The course focuses on mechanisms of: DNA replication, transcription, translation (protein synthesis) and the genetic code, DNA repair, recombination and DNA rearrangements. Techniques used to study molecular biology are presented in the context of these major biological mechanisms. The knowledge gained in this course is considered foundational for most advanced courses in genetics, biochemistry, cell biology, etiology of cancer and other genetically-determined disease states and conditions, virology and immunology, and the list goes on.

Lectures: It is important to attend all of the lectures during the course and to take good notes for study. Prior to attending each lecture, it is important to have read the assigned readings in the textbook. However, many of the lectures will contain new and additional information that is not in the textbook. Examinations will be based mainly on information given in the lectures. In studying for examinations, complete and accurate lecture notes are of prime importance. The lecture slides posted on the course Blackboard site (<https://blackboard.usc.edu>) may contain material that is not in the lectures and the

lectures will often contain additional information that is not conveyed in the slides. Lecture attendance is essential. It may be necessary to make some adjustments in the syllabus during the semester.

Date	Reading assignment	Topics covered
Week 1 Aug22-26	Chap 1, 2, 19.1, 19.2 Dr. Castro lectures	Introduction. Genomes and the flow of Biological Information “Central Dogma”, Biological macromolecules:DNA structure
Week 2 Aug29-Sep2	Chap 2	Biological macromolecules: RNA Structure, DNA structure
Week 3 Sep7-9	Sep 5 is Labor Day Chap 8	Transcription
Week 4 Sep12-16	Chap 8 and 9	Transcription, regulation of transcription
Week 5 Sep19-23	Chap 10 Midterm 1 (Friday Sep 23)	RNA processing, splicing, editing, RNA-binding domains
Week 6 Sep26-30	Chap 11	Translation and the ribosome
Week 7 Oct3-7	Chap (12) and 13	(Regulation of translation), regulatory RNAs, small RNAs
Week 8 Oct10,12	Chap 4 and 5 Dr. Aparicio begins lecturing Mon Oct 11 Oct 13-14 is Fall Recess	Chromatin Structure, Chromosomes, and Cell Cycle
Week 9 Oct17-21	Chap 6	DNA Replication
Week 10 Oct24-28	Chap 6 and 19.3, 19.4, 19.8 Chap 7 Midterm 2 (Friday Oct 28)	DNA Replication, DNA Sequencing, Polymerase Chain Reaction (PCR), Chromosome Segregation
Week 11 Oct31-Nov4	Chap 15	Types of damages and repair pathways (MMR, Direct Reversal, BER)
Week 12 Nov7-11	Chap 15 (Friday, Nov 11 is Veteran’s Day)	Types of damages and repair pathways (NER, TLS), cellular responses to DNA damage, DSB repair
Week 13 Nov14-18	Chap 16 and 19.13	Homologous recombination
Week 14 Nov21	Chap 16 Nov 23-25 is Thanksgiving Holiday	Regulation of Homologous Recombination, HR proteins, meiotic recombination
Week 15 Nov28-Dec2	Chap 17	Transposons, site-specific recombination, VDJ recombination
	Final Exam – Mon. Dec 12 4:30-6:30pm The final exam is NOT held on the regular time and date in the course catalogue	

Statement on Academic Conduct and 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 scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Student Health Counseling Services - (213) 740-7711 – 24/7 on call
engemannshc.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) 740-4900 – 24/7 on call
engemannshc.usc.edu/rsvp

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086
equity.usc.edu, titleix.usc.edu

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421
studentaffairs.usc.edu/bias-assessment-response-support

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710

studentaffairs.usc.edu/ssu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (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.