

Molecular Biology - BISC 320L - DRAFT

Fall 2021

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)
Carolyn Phillips, Ph.D., Assistant Professor (cphil@usc.edu)
Eric Noakes, Instructional Laboratory Manager (enoakes@usc.edu)

Office hours: Aparicio Mondays 2:30-4:30 PM in RRI 221 (Aug23-Aug30, Oct18-Nov29)
Phillips Mondays 2:30-4:30 PM in RRI 303B (Sep13-Oct11)

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 Laboratory 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 on Blackboard: <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 Aug23-27	Chap 1, 2, 19.1, 19.2 Dr. Aparicio lecturing	Introduction. Genomes and the flow of Biological Information “Central Dogma”, Biological molecules
Week 2 Aug30-Sep3	Chap 2, 4 and 14.6, 14.7, 14.9,	Biological molecules, Chromosome structure and function
Week 3 Sep8-10	Sep 6 is Labor Day Chap 8 Dr. Phillips begins lecturing Wed Sep 8	Transcription
Week 4 Sep13-17	Chap 8 and 9	Transcription, regulation of transcription
Week 5 Sep20-24	Chap 10 Midterm 1 (Friday Sep 24) TENTATIVE!	RNA processing, splicing, editing, RNA-binding domains
Week 6 Sep27-Oct1	Chap 11	Translation and the ribosome
Week 7 Oct4-8	Chap (12) and 13	(Regulation of translation), regulatory RNAs, small RNAs
Week 8 Oct11,13	Chap 3 and 5 Dr. Aparicio begins lecturing Mon Oct 11 Oct 15 is Fall Recess	Chemical Basis of Life and Cell Cycle
Week 9 Oct18-22	Chap 6	DNA Replication
Week 10 Oct25-29	Chap 6 and 19.3, 19.4, 19.8 Chap 7 Midterm 2 (Friday Oct 29) TENTATIVE!	DNA Replication, DNA Sequencing, Polymerase Chain Reaction (PCR), Chromosome Segregation
Week 11 Nov1-5	Chap 15	Types of damages and repair pathways (MMR, Direct Reversal, BER)
Week 12 Nov8-12	Chap 15	Types of damages and repair pathways (NER, TLS), cellular responses to DNA damage, DSB repair
Week 13 Nov15-19	Chap 16 and 19.13	Homologous recombination
Week 14 Nov22	Chap 16 Nov 24-26 is Thanksgiving Holiday	Regulation of Homologous Recombination, HR proteins, meiotic recombination
Week 15 Nov29-Dec3	Chap 17	Transposons, site-specific recombination, VDJ recombination
Dec 13 4:30pm	Final Exam - 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.

BISC-320L – Molecular Biology Laboratory

Syllabus and Schedule – Fall 2021

INSTRUCTIONAL LABORATORY MANAGER

Eric Noakes, M.S. (He/Him/His)

Office: ZHS 353

E-mail: enoakes@usc.edu

LABORATORY INSTRUCTORS

Please see the 'Contacts' tab on the laboratory Blackboard site.

BLACKBOARD CONTENT

Lab materials will be available online through Blackboard. This includes course materials like the syllabus and lab manual, announcements, lab presentation slides, quizzes, and grades. It is your responsibility to keep up with the content on Blackboard. For your convenience, an overview announcement will be made every Friday at 5:00pm to outline everything happening the following week. You will use your USC e-mail username and password to access Blackboard at this link: <https://blackboard.usd.edu>. If you have technical issues please contact: blackboard@usc.edu.

REQUIRED LABORATORY SUPPLIES

1. Carbon Copy Laboratory Notebook
2. Lab Coat
3. Lab Safety Goggles
4. Fine Point Permanent Marker

ATTENDANCE

You are required to attend all weekly laboratory sessions in your registered section. You should remain for the entire lab session or until you are excused by your laboratory instructor. Appointments that will interfere with your regularly scheduled lab section should not be made.

LABORATORY POINT DISTRIBUTION

Course Contract – 1 point

Quizzes – 8 points (8 x 1 point each)

Formal Lab Report – 30 points

Academic Dishonesty Tutorial – 1 point

Post-Labs – 30 points (4 x 7.5 points each)

Lab Final – 30 points

Total – 100 points (25% of total course grade)

Laboratory Policies

DURING LAB

You will be expected to come dressed in appropriate attire. All students should be wearing closed-toe shoes. No shorts should be worn in the lab. All students must wear a lab coat and other proper personal protective equipment (PPE) while inside the lab. If you are not dressed in proper attire you will be denied entry to the lab.

You should come to lab fully prepared for the experiment at hand. This means you should review the experiment background and protocols ahead of time and bring the printed lab manual chapter to each lab (or at least write the procedure in your lab notebook).

Students are expected to participate in the experiments, clean-up, and disposal of waste for every lab. In the instance that a lab station is left unsatisfactory, 10 points will be deducted from your overall grade, per occurrence. If the source of a violation cannot be determined, 10 points will be deducted from the entire class. It is everyone's responsibility to ensure the lab is maintained in a safe and clean manner.

LAB MAKE-UP OR SUBSTITUTION

If you miss your regular lab due to a serious illness or emergency which prevents you from attending school, you may attend another open lab section within the same week. We cannot offer make-up labs outside of the regularly scheduled lab sessions. Contact the instructional laboratory manager within 24 hours of your missed lab to make arrangements for make-up of missed content.

If you need to make a lab substitution due to an unforeseen event or religious holiday, contact the instructional laboratory manager at least 48 hours in advance to get approval. Space cannot be guaranteed in other lab sections, so the more notice the better.

Documentation will be required for all make-ups and substitutions. A valid excuse must include contacts for verification purposes. Students who visit the USC Engmann Health Center should fill out an 'Authorization for Disclosure of Medical Information' form and include Eric Noakes under the list of professors. The clinician will be contacted for verification, but no personal medical information will be discussed.

COURSE CONTRACT AND ACADEMIC DISHONESTY TUTORIAL

You must read and digitally sign the course contract and then submit it through Blackboard. You must also complete the academic dishonesty tutorial provided by the USC Libraries and submit a screenshot of the certificate of completion through Blackboard. Both are due by the end of the first week of labs. These represent an agreement to remain accountable to all university, department, and course policies for the duration of the semester, and cover both the lecture and lab portions of the course.

LAB QUIZZES

Pre-lab quizzes will be posted each Friday at 5:00pm prior to the lab it covers. You will be quizzed on all labs except 1 and 10. Quizzes will cover content from the lab manual and lab presentation slides, which will also be posted Friday at 5:00pm. You have unlimited attempts to complete each 15-minute quiz and only your highest score will be recorded. Each quiz must be completed by Monday at 5:00pm and is worth 1 point.

POST-LABS

You will submit four post-lab reports worth 7.5 points each for labs 2, 3, 5, and 6. Each post-lab report is due at the beginning of the lab period during the week indicated in the lab schedule. Post-lab reports should be written in your carbon copy lab notebook and follow the format provided in the lab manual. The only computer-generated items acceptable in the post-lab reports are tables and graphs, which should be printed and pasted onto your lab notebook pages. Please staple your lab notebook pages together when turning them in.

Late post-lab reports will receive a 20%-point deduction for every 24-hour period following the deadline. Unexcused absences from a lab will forfeit your eligibility to receive points for the corresponding post-lab report.

FORMAL LAB REPORT

You will be required to write a formal lab report covering labs 2-9. The formal lab report is due at the beginning of the lab period during the week indicated in the lab schedule and is worth 30 points. You must submit your formal lab report both physically printed and handed to your lab instructor as well as online through the TurnItIn link on Blackboard. Both formats must be submitted by the deadline to be considered on-time. Late formal lab reports will receive a 30%-point reduction if submitted later in the day it is due. No formal lab reports will be accepted after the day it is due, no exceptions.

LAB FINAL EXAM

At the end of the semester there will be a lab practical final exam which will test your understanding of the topics and experimental procedures covered in the laboratory sessions. Further details on the lab final can be found in the lab manual. The lab make-up policies outlined above will apply to the lab final exam as well.

GRADES

All lab grades will be posted on Blackboard within one week of their deadlines. It is your responsibility to notify your lab instructor of any grading errors within one week of their posting. The laboratory section will account for 25% of your total grade in the course.

E-MAIL ETTIQUETTE

Please include your 5-digit lab section number in the subject line when contacting your lab instructors or the instructional laboratory manager. This will expedite any actions needed.

DSP ACCOMMODATIONS

Any student requesting academic accommodations must register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please submit a copy of this letter to the instructional laboratory manager as early in the semester as possible and at least one week prior to an eligible exam for consideration.

ADJUSTMENTS

It may be necessary to make adjustments to the syllabus and schedule during the semester. You are responsible for keeping up with all announcements posted on Blackboard, which will detail any changes if needed. You may adjust the Blackboard notification settings to ensure you don't miss anything. See the following link for instructions on this:

https://help.blackboard.com/Learn/Student/Stay_in_the_Loop/Notifications.

LAB SCORE NORMALIZATION

Lab scores may be normalized at the end of the semester to correct for differences in grading between the lab instructors.

COVID-19 PROTOCOLS

Students must remain compliant with any and all COVID-19 safety protocols outlined by federal, state, local, and university policies. Keep in mind that these policies will evolve with the changing conditions of the COVID-19 pandemic and may include social distancing, the use of face coverings at all times, and regular COVID testing, among others.

Schedule

Week	Dates	Scheduled Labs	Assignments (points)
1	8/23 – 8/27	No Labs	None
2	8/30 – 9/3	Lab Introduction and Orientation + Lab 1: Pipetting and Dilutions	Course Contract (1) Dishonesty Tutorial (1) Quiz 1 (1)
3	9/6 – 9/10	Lab 2: DNA Extraction and Polymerase Chain Reaction	Quiz 2 (1)
4	9/13 – 9/17	Lab 3: Spectrophotometric Analysis and Nested PCR	Post-Lab 1 (7.5) Quiz 3 (1)
5	9/20 – 9/24	Lab 4: PCR Purification	Post-Lab 2 (7.5) Quiz 4 (1)
6	9/27 – 10/1	Lab 5: Gel Electrophoresis and Ligation	Quiz 5 (1)
7	10/4 – 10/8	Lab 6: Transformation	Post-Lab 3 (7.5) Quiz 6 (1)
8	10/11 – 10/15	Fall Recess – No Labs	None
9	10/18 – 10/22	Lab 7: Inoculation and BLAST	Post-Lab 4 (7.5) Quiz 7 (1)
10	10/25 – 10/29	Lab 8: Plasmid Purification and Restriction Enzyme Digest	Quiz 8 (1)
11	11/1 – 11/35	Lab 9: Final Analysis and Discussion + Scientific Writing	None
12	11/8 – 11/12	Lab 10: DNA Spectrophotometric Calibration Curve	Formal Lab Report (30)
13	11/15 – 11/19	Final Review	None
14	11/22 – 11/26	Thanksgiving Break – No Labs	None
15	11/29 – 12/3	Lab Final Exam	Lab Final Exam (30)
16	12/6 – 12/10	Study Days / Final Exams – No Labs	None
17	12/13 – 12/17	Final Exams – No Labs	None