



USC Dornsife

Dana and David Dornsife
College of Letters, Arts and Sciences

BISC 300L: Introduction to Microbiology

13017 - 4 units, Spring term

Tuesday & Thursday, 12:30 – 1:50 pm

Online

Labs – Online

13272 Tues 9:00 – 11:50 am

13273 Wed 9:00 – 11:50 am

Instructor: Shirin Birjandi, Ph.D.

Office: Zoom

Office Hours - Lecture: TBA

Contact Info: birjandi@usc.edu

Lab Manager: Celeste Chong-Cerrillo, Ph.D.

Office: Zoom 'meeting room'

Office Hours: By appointment

Contact Info: chongcer@usc.edu (Subject line should state "BISC 300")

Teaching Assistant:

Office Hours: TBD

Office Hours Location: Zoom 'meeting room'

Contact Info:

Course Description

Introduction to the biology of bacteria, archaea, protists, fungi, and viruses; their structure, life cycles, geochemical activities, diversity, and nutrition. Fundamentals of metabolism, genetics and genomics, microbial biotechnology, roles in health, disease and human immunological responses. Meant for students with fundamental understanding of general biology, molecular biology, and organic chemistry.

Learning Objectives

1. Understand and apply the scientific method, including forming hypotheses, designing experiments to test hypotheses, and collecting, analyzing, interpreting, and reporting data.
2. Understand the structure and function of prokaryotic and eukaryotic cells and viruses, as whole entities and in terms of their subcellular processes.
3. Understand how adaptation works through genomic exchange or mutations.
4. Understand the functioning of organisms at the molecular and cellular levels.
5. Understand the importance of microorganisms in biotechnology.
6. Know the interrelationship between host and infectious agent and compare innate versus acquired immunity.

Prerequisites/Co-Requisites: BISC 320L – Molecular Biology or BISC 312X in lieu of BISC 320L; CHEM 322a/325a–Organic Chemistry

Recommended Preparation: Familiarity with basic chemistry, physics, and algebra is assumed (along with prerequisites for BISC 320L). Basic general biology knowledge is also assumed, but also covered in the text.

Required Texts

- *Prescott's Microbiology*, 10th ed. (or 9th ed.) by Prescott
- Additional readings from primary literature.

Course Notes

Blackboard (<https://blackboard.usc.edu/>) lists BISC 300 lecture and lab sections as “separate courses”. All grades (lecture and lab) are posted in your LAB section. However, be sure to check for additional postings and announcements both in the lecture section and the lab section on a weekly basis.

Blackboard will contain Zoom links, announcements, notes and assignments.

Blackboard is a convenient system to communicate scores and grades; however, those grades are not authoritative. It is the student’s responsibility to notify the instructor or the Lab Manager ASAP in the event of any mistakes in your posted score.

Please remember that (1) the course mean given on Blackboard is also NOT authoritative, and (2) that only the total number of points earned by the end of the semester determines your course grade. We will be glad to discuss your performance, and your possible grades, at any time throughout the course. Help provided in this way should be considered only provisional. Your later performance may change (sometimes dramatically) the best-meant extrapolation.

Email Communication

To ensure privacy, only student’s USC email accounts may be used for email communications. Students are responsible for understanding the content of email messages that the instructor sends to their USC accounts. Therefore, each student must check their USC email regularly and make sure their account is not over quota, so new messages can be received.

Grading Breakdown

The course grade will be based upon 700 possible points:

Assignment	Points	Approx. % of Grade
Midterm 1	100	14
Midterm 2	100	14
Midterm 3	100	14
Final Exam	150	21
Presentation	30	4
Participation	20 (4 pts/presentation)	3
Laboratory	200	29
TOTAL	700	100

Grading Scale

Only the TOTAL number of points earned by the END of the course will determine the final letter grade.

Course final grades will be determined using the following scale unless the average of the class is low then grades will be determined based on a curve.

A	90.1 - 100
A-	86.7 - 90
B+	83.3 - 86.6
B	80 – 83.2
B-	76.7 – 79.9
C+	73.3 – 76.6
C	70 – 73.2
C-	66.7 – 69.9
D+	63.3 – 66.6
D	60 – 63.2
D-	56.7 – 59.9
F	≤56.6

Exceptions to the grading policy are not expected, and any student believing they have been granted a deviation from the grading policies defined in this syllabus must have a written agreement signed by Dr. Birjandi. Final exams will be kept on file for one semester. Challenges to the final grade must be made within 3 weeks of the beginning of the Fall 2021 semester.

Assignments Rubrics and Submission Policy

Exams. Course exams follow the lecture, supplemental reading and text. Complete reading assignments and supplemental material will be posted on Blackboard prior to lecture. There will be three 60 minute exams worth 100 points each plus a final exam worth 150 points. The final will be cumulative.

The final examination will include material composed of questions that integrate concepts developed throughout the course, both in the lecture and the laboratory portions.

LockDown Browser + Webcam Requirement. This course requires the use of LockDown Browser and a webcam for online exams. The webcam can be built into your computer or one that plugs in with a USB cable.

Watch this brief video to get a basic understanding of LockDown Browser and the webcam feature.

<https://www.respondus.com/products/lockdown-browser/student-movie.shtml>

Download Instructions. Download and install LockDown Browser from this link:

<https://download.respondus.com/lockdown/download.php?id=945755274>

Presentations. Presentations are designed to introduce students to current basic research in the areas of microbiology. Student groups will present a primary paper dealing with basic research on class topics. Papers to be presented are listed in the lecture schedule and PDFs will be available on Blackboard. Students will need to form groups and specify the paper(s) and date they will present **no later than 5:00 pm, Tuesday, Feb 2nd**. A group discussion thread will be available on Blackboard to specify the names of the presenters, paper(s), and date of presentation. Preferred dates will be given on a first-come-first-serve basis.

Students are to discuss sufficient background related to the hypothesis of the paper, how the hypothesis was tested, the main results (showing all *figures* of the paper), and the conclusions.

A cohesive Power Point presentation is expected. The total presentation should be about 50 minutes with 10 minutes for discussion and questions at the end. It will be important for student presenters to be able to answer questions from the instructor and other students. *Any relevant bibliography should be included in the presentation.*

Presentation Participation. Students not presenting on a presentation day are still expected to familiarize themselves with the article prior to the presentation in order to ask thoughtful scientific questions pertaining to the work. **Student participation will be evaluated based on attendance and submission of two written questions pertaining to the article(s) presented. Participation is worth 4 pts/presentation for a total of 20 pts.** No credit for participation will be given in the case of an unexcused absence.

Lab Assignments. Refer to Laboratory Syllabus and Policies regarding lab assignments.

Grading Timeline

Grades for Midterm Exams will be posted within one calendar week following the exam date.

Additional Policies

EXAM DATES ARE FIRM. An exam can be taken only on the scheduled date and at the scheduled starting time. **There are no makeup exams in the course.** If a student misses an exam due to a true emergency or valid USC travel, official written documentation (what you feel is appropriate to demonstrate a legitimate reason for missing said exam) should be submitted to Dr. Birjandi within 2 days of the missed exam. Students will only be excused from one exam with a valid excuse. If it is a medical excuse, you must also state in writing (a) the doctor's name and phone number and, (b) a signed statement authorizing us to discuss with the doctor whether you were too ill to take the exam. (Note that neither you

nor the physician needs to tell us the nature of your illness.) Please note it's considered unethical and unwise for a physician to provide medical care for a family member. We will contact the doctor and decide whether you have a valid excuse. If you do, the instructor may, at their discretion, permit the use of the student's performance on other exams in determining the missed exam grade. If your excuse is judged not to be valid, or you do not provide it within the allotted time, you will receive a score of zero for the missed exam.

Re-grading of exams. Your graded midterm exams can be reviewed online for a 30 minute window. If you feel an error was made in the grading of your exam, you must submit your exam, along with a Regrade Request Form (found on Bb) in which you have a thorough (but concise) **typewritten** explanation of why you think your answer deserves more credit, to Dr. Birjandi within 1 week of the time it was viewed. The entire answer will be re-graded, not just the part you think deserves more credit. Your score may increase or decrease as a result of a regrade.

Lecture and Discussion Absences. Attendance at student presentations is expected. If you must miss a student presentation due to illness or valid USC travel, please present Dr. Birjandi with evidence of the reason for absence and you will be allowed to make-up the discussion assignment within 1 week of the missed lecture period.

Late Policy. For every 12-hour increment any assignment is handed in late, you will lose 10% of the total possible points [i.e., if the assignment is past 5 days (120 hrs) late, you will receive a zero (0) for that assignment]. Saturdays, Sundays, and University holidays ARE counted. The Labster simulations adhere to the 72-hr policy as stated in the Lab Syllabus.

Cell phone usage. During lecture you will not be able to use your cell phone – please silence it and keep it either in your backpack/purse.

It may be necessary to adjust the syllabus during the semester; check BLACKBOARD for updates.

Course Schedule: Introduction to Microbiology

Wk	Day	Date	Topic	Chapter
1	Tuesday	Jan 19	Introduction/ microbes in the news Historical perspectives	Ch 1. (p. 1-19)
	Thursday	Jan 21	Microscopy	Ch 2. (22-40)
2	Tuesday	Jan 26	Bacteria Archaea	Ch 3. (p. 42-77) Ch 4
	Thursday	Jan 28	Bacteria Archaea	Ch 3. (p. 42-77) Ch 4
3	Tuesday	Feb 2	Eukaryotic microorganisms I	Ch. 5 Ch. 25-26
	Thursday	Feb 4	Eukaryotic microorganisms II and human infection	Ch. 5 Ch. 25-26
4	Tuesday	Feb 9	Viruses I	Ch. 6 (p. 109-127)
	Thursday	Feb 11 Presentation	Viruses II and human infection	Ch. 27 Yin, 2020 Du, 2009
5	Tuesday	Feb 16	MIDTERM 1 (material up to 2/11)	
	Thursday	Feb 18	Microbial growth	Ch. 7 (132-136; 141-164)
6	Tuesday	Feb 23	Control of microbial growth I	Ch. 8 (p. 172-184)
	Thursday	Feb 25 Presentation	Control of microbial growth II	Ch. 9 (p. 188-203) Ling, 2015 Janssens, 2008
7	Tuesday	Mar 2	Respiration, catabolism and anabolism	Ch. 10 Ch. 11
	Thursday	Mar 4	Fermentation and food microbiology	Ch. 11 (p. 245-248) Ch. 41 (p. 937-945)
8	Tuesday	Mar 9	Genomes and mutations: Mechanisms of genetic variation I	Ch. 16 (p. 369-384)
	Thursday	Mar 11 Presentation	Genomes and mutations: Mechanisms of genetic variation II	Ch. 16 (p. 369-384) Oliver, 2000 Lartigue, 2007
9	Tuesday	Mar 16	MIDTERM 2 (material up to 3/11)	
	Thursday	Mar 18	Horizontal gene transfer	Ch. 16 (p. 383-397)
10	Tuesday	Mar 23	Transcriptional regulation: Regulation of bacterial cellular processes	Ch. 14 (p. 321-339)
11	Thursday	Mar 25	Wellness Day	
	Tuesday	Mar 30 Presentation	Motility and chemotaxis Quorum sensing	Ch. 14 (p. 334-335; 339-341; 342-344) Shukla, 1998 Kroupitski, 2009
12	Thursday	Apr 1	Molecular Tools: role of microbes in biotechnology I	Ch. 17 (p. 400-403; 406-414) Ch. 18 (p. 420-428)
	Tuesday	Apr 6	Molecular Tools: role of microbes in biotechnology II	Ch. 17 (p. 400-403; 406-414) Ch. 18 (p. 420-428)
13	Thursday	Apr 8	MIDTERM 3 (material up to 4/6)	

	Tuesday	Apr 13	Innate immunity	Ch. 33 (p. 707-734)
14	Thursday	Apr 15	Adaptive immunity	Ch. 34 (p. 736-760)
	Tuesday	Apr 20 Presentation	Microbiome	Ch. 32 (p. 698-706) Gill, 2006 Cho, 2014
15	Thursday	Apr 22	Wellness Day	
	Tuesday	Apr 27	Introduction to infectious diseases: Pathogenicity and infection I; Introduction to epidemiology I	Ch. 35 (p. 770-784) Ch. 37 (p.806-808)
16	Thursday	Apr 29 Presentation	Introduction to infectious diseases: Pathogenicity and infection II; Introduction to epidemiology II	Ch. 35 (p. 770-784) Ch. 37 (p.806-808) Nelson, 2009 Kreth, 2005
	Wednesday	May 12	FINAL EXAM – Cumulative (2 - 4 pm)	

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, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

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

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.

Provides overall safety to USC community. dps.usc.edu