



BISC 300L: Introduction to Microbiology

13017 - 4 units, Spring term

Tuesday & Thursday, 12:30 – 1:50 pm

TBD

Labs – ZHS 472

13272 Wed 9:00 – 11:50 am

13273 Wed 1:00 – 3:50 pm

Instructor: Shirin Birjandi, Ph.D.

Office: ZHS 256

Office Hours - Lecture: TBD

Contact Info: birjandi@usc.edu

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

Office: ZHS 450

Office Hours: Open door policy

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

Teaching Assistants: TBD

Office Hours: TBD

Office Hours Location: ZHS 472

Contact Info:

Course Description

Introduction to the biology of bacteria, 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 (**FIRM**); 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 and Laboratory Manual

- *Prescott's Microbiology*, 10th ed. (or 9th ed.) by Prescott
- *Introduction to Microbiology Laboratory Manual*, Spring 2020 (USC Bookstore)
- Additional readings from primary literature.

Course Notes

Blackboard (<https://blackboard.usc.edu/>) will list BISC 300L lecture and lab sections as one course. Blackboard will contain 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 730 possible points:

Assignment	Points	Approx. % of Grade
Midterm 1	100	13.5
Midterm 2	100	13.5
Midterm 3	100	13.5
Final Exam	150	21
Presentation	20	3
Participation	20 (5 pts/presentation)	3
Laboratory	240	33
TOTAL	730	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

Chronic, unexcused absence from laboratory (more than two unexcused absences) will result in a grade penalty above and beyond missed work or exercises. 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 2020 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 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.

A student is not allowed to start an exam after the first student has left any exam room. You may be required to write your full name on EACH page of an exam. If you fail to do so, ½ point will be deducted for each page missing a full name. Seating arrangements may be specified by the instructor. No writing is allowed after the instructors/TAs say the exam period has ended.

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 11th**. 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 30 minutes with 10 minutes for discussion and questions and 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 and graded by the instructor. Participation is worth 5 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 that your physician has to be licensed to practice medicine by the State of California (www.medbd.ca.gov) and that 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.

Please note: The Engemann Student Health Center has changed their medical excuse policy. They will no longer provide: 1) class excuse notes for illness, 2) clinical appointments for class excuse, and 3) authentication of outside physician certificates. The *Absence of Class - Self Verification Form* provided by the Student Health Center is insufficient documentation for our purposes. The recommended sanction for falsification of medical documentation is an F in the course and suspension or expulsion from the university.

Re-grading of exams. Your midterm exams will be handed back either in lab or lecture and the answer key will be posted. 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 returned to the entire class. Oral and email requests will not be considered. If you took the exam in pencil or used white-out, we will not grant regrade requests. 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 all lecture and 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.

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. We reserve the right to collect your cell phones during exam days, both in lecture and lab. Similarly, no calculators, tablets, smart watches, Google glasses, etc. will be allowed.

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 14	Introduction/ microbes in the news Historical perspectives	Ch 1. (p. 1-19)
	Thursday	Jan 16	Microscopy	Ch 2. (22-40)
2	Tuesday	Jan 21	Bacteria Archaea	Ch 3. (p. 42-77) Ch 4
	Thursday	Jan 23	Eukaryotic microorganisms I	Ch. 5 Ch.25-26 Ch. 40
3	Tuesday	Jan 28	Eukaryotic microorganisms II and human infection	Ch. 5 Ch.25-26 Ch. 40
	Thursday	Jan 30	Viruses I	Ch. 6 (p. 109-127)
4	Tuesday	Feb 4	Viruses II and human infection	Ch. 38
	Thursday	Feb 6	Microbial growth	Ch. 7 (132-136; 141-164)
5	Tuesday	Feb 11	MIDTERM 1 (material up to 2/4)	
	Thursday	Feb 13	Control of microbial growth I	Ch. 8 (p. 172-184) Ch. 9 (p. 188-203)
6	Tuesday	Feb 18 Presentation	Control of microbial growth II	Ch. 8 (p. 172-184) Ch. 9 (p. 188-203) Ling, 2015 Janssens, 2008
	Thursday	Feb 20	Respiration, catabolism and anabolism I	Ch. 11 (p. 227-245; 248-252) Ch. 12 (p. 262-266; 268-270)
7	Tuesday	Feb 25	Respiration, catabolism and anabolism II	Ch. 11 (p. 227-245; 248-252) Ch. 12 (p. 262-266; 268-270)
	Thursday	Feb 27	Fermentation and food microbiology	Ch. 11 (p. 245-248) Ch. 41 (p. 937-945)
8	Tuesday	Mar 3	MIDTERM 2 (material up to 2/27)	
	Thursday	Mar 5	Genomes and mutations: Mechanisms of Genetic Variation I	Ch. 16 (p. 369-384)
9	Tuesday	Mar 10 Presentation	Genomes and mutations: Mechanisms of Genetic Variation II	Ch. 16 (p. 369-384) Oliver, 2000 Lartigue, 2007
	Thursday	Mar 12	Horizontal gene transfer	Ch. 16 (p. 383-397)
10	Mon - Fri	Mar 16-20	Spring Break	
11	Tuesday	Mar 24	Transcriptional regulation: Regulation of Bacterial Cellular Processes	Ch. 14 (p. 321-339)
	Thursday	Mar 26 Presentation	Motility and chemotaxis Quorum sensing	Ch. 14 (p. 334-335; 339-341; 342-344) Shukla, 1998 Kroupitski, 2009
12	Tuesday	Mar 31	Molecular Tools: role of microbes in biotechnology I	Ch. 17 (p. 400-403; 406-414) Ch. 18 (p. 420-428)
	Thursday	Apr 2	Molecular Tools: role of microbes in biotechnology II	Ch. 17 (p. 400-403; 406-414) Ch. 18 (p. 420-428)
13	Tuesday	Apr 7	MIDTERM 3 (material up to 4/2)	
	Thursday	Apr 9	Innate immunity I	Ch. 33 (p. 707-734)

14	Tuesday	Apr 14	Innate immunity II	Ch. 33 (p. 707-734)
	Thursday	Apr 16	Adaptive immunity I	Ch. 34 (p. 736-760)
15	Tuesday	Apr 21	Adaptive immunity II	Ch. 34 (p. 736-760)
	Thursday	Apr 23 Presentation	Microbiome	Ch. 32 (p. 698-706) Gill, 2006 Cho, 2014

16	Tuesday	Apr 28	Introduction to infectious diseases: Pathogenicity and Infection I; Introduction to epidemiology I	Ch. 35 (p. 770-784) Ch. 37 (p.806-808)
	Thursday	Apr 30 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 13	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