



BISC 300L: Introduction to Microbiology

13017 - 4 units, Spring 2023

Tuesday & Thursday, 12:30 – 1:50 pm

Location: ZHS 163

Labs

13272 Wed 9:00 – 11:50 am

13273 Wed 1:00 – 3:50 pm

Location: ZHS 472

Instructor: Shirin Birjandi, Ph.D.

Office: SGM 611 or Zoom ‘meeting room’

Office Hours: TBD

Contact Info: birjandi@usc.edu

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

Office: ZHS 450 or Zoom ‘meeting room’

Office Hours: Open door policy or by appointment

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

Lab Instructors (Lis): Anna Weiss (acweiss@usc.edu)

Daria Di Blasi (ddibiasi@usc.edu)

Office Hours: TBD

Office Hours Location: ZHS 472 or Zoom ‘meeting room’

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: One from BISC 103 or BISC 120 or BISC 121 or BISC 220 or BISC 221 and one from BISC 312 or BISC 320

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

Required Texts

- *Prescott's Microbiology*, 11th ed. (or 10th ed.) by Prescott
- *Introduction to Microbiology Laboratory Manual*, Spring 2023 (USC Bookstore)
- Additional readings from primary literature.

COVID-19 Protocol

Students are expected to comply with any and all aspects of 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 appropriate masks which cover your nose and mouth at all times (regardless of vaccination status), and regular Trojan Check and/or COVID testing, among others. Failure to comply may result in removal from the class and referral to Student Judicial Affairs and Community Standards (SJACS).

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	14.2
Midterm 2	100	14.2
Midterm 3	100	14.2
Final Exam	150	21.4
Presentation	30	4.2
Participation	20 (4 pts/presentation)	2.9
Laboratory	200	28.6
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

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 2023 semester.

Assignments Rubrics and Submission Policy

Exams. Course exams will be administered via Blackboard. Students will be required to bring their laptops to class on exam dates. Please let your instructor know if you will need to make other arrangements in advance and a paper exam will be given. 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.

A student is not allowed to start an exam after the first student has left any exam room. Seating arrangements may be specified by the instructor. No writing/typing is allowed after the instructors/LIs 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, January 31st**. 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 45 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.

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 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 can submit a regrade request 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 5 days (120 hrs) late, you will receive a zero (0) for that assignment]. Saturdays, Sundays, and University holidays ARE counted.

Blackboard and Posting of Grades. Blackboard (<https://blackboard.usc.edu/>) lists BISC 300 lecture and lab sections as “separate courses”. All grades (lecture and lab) will be 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.

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 (subject to modification of specific topic and readings)

Wk	Day	Date	Topic	Chapter
1	Tuesday	Jan 10	Introduction/ microbes in the news Historical perspectives	Ch 1. (p. 1-19)
	Thursday	Jan 12	Microscopy I	Ch 2. (22-40)
2	Tuesday	Jan 17	Microscopy II	Ch 2. (22-40)
	Thursday	Jan 19	Bacteria Archaea I	Ch 3. (p. 42-77) Ch 4
3	Tuesday	Jan 24	Bacteria Archaea II	Ch 3. (p. 42-77) Ch 4
	Thursday	Jan 26	Eukaryotic microorganisms I	Ch. 5 Ch. 25-26
4	Tuesday	Jan 31	Eukaryotic microorganisms II and human infection	Ch. 5 Ch. 25-26
	Thursday	Feb 2 Presentation	Viruses I	Ch. 6 (p. 109-127) Yin, 2020 Du, 2009 Doremalen, 2020
5	Tuesday	Feb 7	Viruses I	Ch. 6 (p. 109-127)
	Thursday	Feb 9	MIDTERM 1 (material up to 2/7)	
6	Tuesday	Feb 14	Viruses II and human infection	Ch. 27
	Thursday	Feb 16 Presentation	Viruses II and human infection	Ch. 27 Ling, 2015 Janssens, 2008
7	Tuesday	Feb 21	Microbial growth	Ch. 7 (132-136; 141-164)
	Thursday	Feb 23	Control of microbial growth I	Ch. 8 (p. 172-184)
8	Tuesday	Feb 28 Presentation	Control of microbial growth II	Ch. 9 (p. 188-203) Oliver, 2000 Lartigue, 2007
	Thursday	Mar 2	Respiration, catabolism and anabolism I	Ch. 10 Ch. 11
9	Tuesday	Mar 7	Respiration, catabolism and anabolism II	Ch. 10 Ch. 11
	Thursday	Mar 9	MIDTERM 2 (material up to 3/7)	
10		Mar 12-19	Spring Break	
11	Tuesday	Mar 21	Fermentation and food microbiology I	Ch. 11 Ch. 41 (p. 937-945)
	Thursday	Mar 23 Presentation	Fermentation and food microbiology II	Ch. 11 Ch. 41 (p. 937-945) Shukla, 1998 Kroupitski, 2009
12	Tuesday	Mar 28	Genomes and mutations: Mechanisms of genetic variation I	Ch. 16 (p. 369-384)
	Thursday	Mar 30 Presentation	Genomes and mutations: Mechanisms of genetic variation II	Ch. 16 (p. 369-384) Nelson, 2009 Kreth, 2005

13	Tuesday	Apr 4	Horizontal gene transfer Motility and chemotaxis Quorum sensing I	Ch. 16 (p. 383-397) Ch. 14 (p. 334-335; 339-341; 342-344)
	Thursday	Apr 6	Horizontal gene transfer Motility and chemotaxis Quorum sensing II	Ch. 16 (p. 383-397) Ch. 14 (p. 334-335; 339-341; 342-344)
14	Tuesday	Apr 11	MIDTERM 3 (material up to 4/6)	
	Thursday	Apr 13 Presentation	Molecular Tools: role of microbes in biotechnology I	Ch. 17 (p. 400-403; 406-414) Ch. 18 (p. 420-428)Ch. 34 (p. 736-760) Gill, 2006 Cho, 2014
15	Tuesday	Apr 18	Molecular Tools: role of microbes in biotechnology II	Ch. 17 (p. 400-403; 406-414) Ch. 18 (p. 420-428)Ch. 34 (p. 736-760)
	Thursday	Apr 20	Innate immunity	Ch. 33 (p. 707-734)
16	Tuesday	Apr 25	Adaptive immunity	34 (736-760)
	Thursday	Apr 27	Microbiome	Ch 32. (p. 806-808)
	Wednesday	May 10	FINAL EXAM (2 – 3:30 pm) – Cumulative	

Statement on Academic Conduct and Support Systems

Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see [the student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

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

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

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

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

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 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) 740-0411

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

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

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) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

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) 442-2850 or otfp@med.usc.edu

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