

BISC 300L INTRODUCTION TO MICROBIOLOGY

Spring 2016

Instructors

Dr. John F. Heidelberg
Office: AHF 209D
Office hours: By appt.
Phone:
Email: jheidelb@usc.edu

Dr. Jed Fuhrman
Office: AHF 211
Office hours: By appt.
Office Phone 213-740-5757
E-mail: fuhrman@usc.edu

Dr. Celeste Chong-Cerrillo
Office: ZHS 450
Office Hours: By appt.
Office Phone: 213-740-6085
Email: chongcer@usc.edu

Teaching Assistants

Joshua Kling – joshuakl@usc.edu
Patrick Sun – patricys@usc.edu
Dmitri Svetlov – svetlov@usc.edu
Jason Wang – wang402@usc.edu

Meeting times

13017	Lecture	12:30 - 1:50 pm; Tue, Thu	MHP 101
13270	Lab	9:00 - 11:50 am, Tuesday	ZHS 472
13271	Lab	2:00 - 4:50 pm, Tuesday	ZHS 472
13272	Lab	9:00 - 11:50 am, Wednesday	ZHS 472
13275	Lab	2:00 - 4:50 pm, Thursday	ZHS 472

Prerequisites

- BISC 320L (Molecular Biology)
- Or permission of instructor.
- 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.

Text and Laboratory Manual

- *Brock Biology of Microorganisms (14th Edition)* by Madigan, Martinko, Bender, Buckley, Stahl
- *Introduction to Microbiology Laboratory Manual*, 2016 (available at the USC Bookstore)
- Additional readings from the primary literature may also be assigned.

Total points

Exams	400 points (100 points each exam, including final)
<u>Laboratory</u>	<u>240 points</u>
TOTAL	640 points

The final examination will include material composed of questions that integrate concepts developed throughout the course, both in the lecture and the laboratory portions, with extra emphasis on the final lectures of the class not previously covered on exams.

BISC 300L Syllabus Spring 2016 **DRAFT**

Wk	Day	Date	Topic	Chapter	Lecturer
1	Tuesday	Jan 12	Microbial Cell Structure & Function	1,2	JF
	Thursday	Jan 14	Metabolism & Control	3,4	JF
2	Tuesday	Jan 19	Growth, Genomics I	5,6	JF
	Thursday	Jan 21	Genomics II, Regulation	6,7	JF
3	Tuesday	Jan 26	Viruses 1	8	JF
	Thursday	Jan 28	Viruses 2	9	JF
4	Tuesday	Feb 2	Bacterial & Archaeal Genetics	10	JF
	Thursday	Feb 4	Microb Evolution & Systematics	12	JF
5	Tuesday	Feb 9	Midterm #1		
	Thursday	Feb 11	Metabolic Diversity	13	JF
6	Tuesday	Feb 16	Functional Diversity	14	JF
	Thursday	Feb 18	Eukaryotic Diversity	17	JF
7	Tuesday	Feb 23	Genetic Engineering	11	JH
	Thursday	Feb 25	Bacterial Diversity	15	JH/Webb
8	Tuesday	Mar 1	Archaeal Diversity	16	JF
	Thursday	Mar 3	Methods in Microbial Ecology	18	JF
9	Tuesday	Mar 8	Microbial Ecosystems	19	JH
	Thursday	Mar 10	Midterm #2		
10	M - F	Mar 14 - 18	Spring Break		
11	Tuesday	Mar 22	Nutrient Cycles	20	JH
	Thursday	Mar 24	Microbial Symbiosis	23	JH
12	Tuesday	Mar 29	Microbial Interactions with Humans	22	JH
	Thursday	Mar 31	Microbiology of the Built Environment	21	JH
13	Tuesday	Apr 5	Intro to Immunology	Parts of 24,25,26	JH
	Thursday	Apr 7	Diagnostic Microbiology	27	JH
14	Tuesday	Apr 12	Epidemiology	28	JH
	Thursday	Apr 14	Midterm #3		
15	Tuesday	Apr 19	Person-to-person Disease	29	JH
	Thursday	Apr 21	Person-to-person Disease	29	JH
16	Tuesday	Apr 26	Vectorborne and soilborne disease	30	JH
	Thursday	Apr 28	Water and food as vehicles for disease	31	JH
	Wed	May 11	Final Exam - 2 - 4 pm		

1. 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, official written documentation (what you feel is appropriate to demonstrate a legitimate reason for missing said exam) should be submitted to Dr. Chong-Cerrillo *within 3 days* of the missed exam. 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. If you were seen at the USC Student Health Center, you must sign an "Authorization for Disclosure of Medical Information" form and list Dr. Chong-Cerrillo's name on the form. (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). Also note that it's considered unethical and unwise for a physician to provide medical care for a family member. The recommended sanction for falsification of medical documentation is an F in the course and suspension or expulsion from the university. Your professors 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.

2. 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 faculty. No writing is allowed after the instructors/TAs say the exam period has ended.
3. Regrading of exams will be managed only by Dr. Chong-Cerrillo. Exams submitted for regrading must be turned in along with a Regrade Request Form which will have your concise **typewritten** explanation of the problem. Regrade requests will be accepted by a TA or Dr. Chong-Cerrillo only within one week of the day when the exam is initially returned to the class (regardless of whether you were present that day). 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 re-grade. Regrade requests will not be honored if the exam was taken in pencil.
4. No special assignments for extra credit can be offered to an individual student or subset of students, because that would be considered unethical.
5. Final grades are assigned on a curve, based entirely on the total number of points earned in the course. Please remember that (1) the course mean given on Blackboard is NOT authoritative, and (2) that only the total number of points earned 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, however: your later performance may change (sometimes dramatically) the best-meant extrapolation.
6. 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 2016 semester.
7. 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. Fuhrman & Dr. Heidelberg.
8. 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.
9. It may be necessary to make adjustments to the syllabus during the semester; check BLACKBOARD for updates.
10. Students requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. Please be sure the letter is delivered to Dr. Chong-Cerrillo as early in the semester as possible. DSP is open

Monday-Friday, 8:30AM-5:00PM, Email: ability@usc.edu, Phone: 213-740-0776. Please note that any accommodation based on a disability has to be made through DSP. Your professors and TAs are not allowed to make additional accommodations.

11. Statement on Academic Integrity - USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. Academic Integrity policies of the University will be strictly followed. SCampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00 (<http://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>), while the recommended sanctions are located in Appendix A: https://studentaffairs.usc.edu/files/2015/09/appendix_a.pdf. (**may be updated in more recent versions**) Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>

Introduction to the Microbiology Laboratory Policies

Laboratory: ZHS 472, Section 13270 - Tuesday, 9:00 a.m. – 11:50 a.m.
Section 13271 - Tuesday, 2:00 p.m. – 4:50 p.m.
Section 13272 - Wednesday, 9:00 a.m. – 11:50 p.m.
Section 13275 - Thursday, 2:00 p.m. – 4:50 p.m.

Laboratory Manager: **Dr. Chong-Cerrillo, Ph.D.**

Office: ZHS 450

Phone: (213) 740-6085

E-mail: chongcer@usc.edu (**the subject line should state: "BISC 300"**)

Office Hours: Open door policy and by appointment

TAs: Joshua Kling
E-mail: joshuakl@usc.edu

Dmitri Svetlov
E-mail: svetlov@usc.edu

Patrick Sun
E-mail: patricys@usc.edu

Jason Wang
E-mail: wang402@usc.edu

TAs' Office Hours: TBA

Required Text: *Introduction to Microbiology Laboratory Manual*, Spring 2016, Celeste Chong-Cerrillo, Ph.D. (USC Custom Publishing)

Web Site: Blackboard (<https://blackboard.usc.edu/>)

General Policies

You are required to attend all lab sessions. You will not be able to make up any missed labs. If a student misses a lab due to a true emergency situation, an acceptable written excuse must be submitted within 3 days to Dr. Chong-Cerrillo. Then it will be at her discretion to determine whether the lab will be made up. However, if the documentation is not received within this time frame, you will not be allowed to make up the missed lab.

In addition, switching labs is not allowed; you must attend the lab section you are registered for. If you have a compelling reason for not being able to attend your lab section AND you speak to Dr. Chong-Cerrillo in advance (the sooner the better), exceptions may be allowed. If you make up the work in another lab section but you have not spoken to Dr. Chong-Cerrillo, you will still be marked absent for that lab.

Please come to class and lab on time and do not schedule any appointments during your regular lab period. You are required to remain for the entire lab session or until excused by your TA.

Come to lab prepared (i.e., read and know your lab exercise BEFORE you come).

Due to limited storage space, the Micro lab only has 35 microscopes total. Therefore, you will be sharing your scope with other students. These microscopes are fairly new and expensive. It is your responsibility to keep them clean and in good working condition, especially since other students will be using them. Moreover, a clean scope is crucial for good microscopic analysis.

You will be given a set of common laboratory supplies that you will use throughout the semester. These supplies will be kept in a box that you will share with your partner. Please properly maintain these supplies, as they will not be replaced unless absolutely necessary.

You are required to wear a 100% cotton, long-sleeve, below-the-waist lab coat at all times in the lab (aprons are not allowed). **You will need to provide your own lab coat** (available at the bookstore or a uniform store) and bring it to the first scheduled lab session.

All students must sign and abide by the “Laboratory Safety Rules and Regulations” Contract.

Keep the ringers of your cell phones either off or on vibrate. If you need to speak on the phone to anyone for any reason during class, take your conversations out of the room and away from Dr. Chong-Cerrillo’s office.

Laboratory Grade[§]

The laboratory grade, worth 240 points, breaks down as follows:

2 Lab Exams (20 points each)	40
Lab Reports:	
Organisms in the Environment	15
API Unknown	10
Bacterial Transformation	15
Winogradsky Column	40
Formal Lab Report	50
Lab Notebook Check	10
Subjective*	10
<u>Final Laboratory Exam</u>	<u>50</u>
Laboratory Total	240

*Based on class participation, attendance, initiative, attitude

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

Lab Exams

Lab exams will test your ***understanding*** of the topics and exercises covered in the laboratory sessions. Lab exams will be at the beginning of the lab session.

It is your responsibility to be present on the days of the lab exams. If you miss a lab exam due to a true emergency, you must present a valid excuse to the Lab Manager within two (2) days of the missed exam. A valid medical excuse must 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. If you were seen at the USC Student Health Center, you must sign an "Authorization for Disclosure of Medical Information" form and *list Dr. Chong-Cerrillo's name* (NOT your TA) on the form. (Note that neither you nor the physician need 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 have a valid excuse, the Laboratory Manager may, at her discretion, allow you to take the exam in another lab section that week, schedule a make-up or permit the use of the average of other exams in determining the grade. If you do not have a valid excuse or fail to provide it within the allotted time, you will receive zero points for the missed lab exam.

Your lab exams will be handed back to you and reviewed in lab. If you feel an error was made in the grading of your exam, you must submit your exam, along with a thoroughly written explanation of why you think your answer deserves more credit, to your TA within 2 days of the time it was returned to the entire class. Oral and e-mail requests will not be considered. If you took the exam in pencil, we will not honor a regrade request. 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 re-grade.

Laboratory Reports

There are a few Chapters where you are required to turn in Lab Reports consisting of data and data analysis for that exercise. Those excersies are as follows:

Chapter	Lab
3	Organisms in the Environment
6	The Winogradsky Column
24	API Unknown*
25	Bacterial Transformation

The lab reports are to be handed in during lab, at the beginning of the lab session except for the *API Unknown which will be handed in at the end of the lab session. Please refer to the Lab Schedule for the due dates. For EACH day any report is handed in late, you will lose 20% of the total possible points (i.e., if the report is past 5 days late, you will receive no points for that assignment).

Laboratory Notebook Check

Even though you are not required to hand in weekly lab reports, there will be ***random notebook checks*** throughout the semester (i.e., you will receive NO warning or “heads-up,” therefore keep up with your data recording and answering of questions at the end of each chapter). Properly documented data and results will help you later in the semester, especially for the Lab Final Exam.

Formal Laboratory Report

You will be required to submit one Formal Laboratory Report for *Chapter 10 - Nutrition and Growth of Bacteria*. Please refer to the “Formal Laboratory Report Format Guidelines” located in this section for policies and guidelines regarding the Formal Lab Report. The lab reports listed above do NOT follow this format.

The Formal Laboratory Report must be ORIGINAL WORK by the student involved. Plagiarism is strictly forbidden and will be treated with the usual University policies if it is encountered.

An electronic copy of your Formal Lab Report will be submitted through TurnItIn on your LAB Blackboard site under the “Assignments” tab. Make sure the document you submit is a single file and your FINAL version; you cannot upload twice. *If you do not receive an email confirmation, your upload was NOT successful.* Do not wait until the last minute to submit your paper. Blackboard can have issues that we are not responsible for and 5:01 pm is considered late. You will also be required to hand in a hard copy to your TAs the following lab session.

For EACH day the Formal Report is handed in late, you will lose 20% of the total possible points (i.e., if the report is past 5 days late, you will receive no points for that assignment).

Blackboard and Posting of Grades/Scores

Blackboard (<https://blackboard.usc.edu/>) is used as a convenient way to communicate scores and grades; however, ***those grades are not authoritative***. Blackboard will list BISC 300 lecture and lab sections as “separate courses”. All scores (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. It is the student’s responsibility to notify your TA or Lab Manager ASAP in the event of any mistakes in your posted score.

Please remember that (1) the course mean given on Blackboard is NOT authoritative, and (2) that only the total number of points earned 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.

Academic Accommodations

Students requesting academic accommodations based on an academic disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. Please be sure the letter is delivered to Dr. Chong-Cerrillo as early in the semester as possible. DSP is open Monday-Friday, 8:30 am - 5:00 pm, Email: ability@usc.edu, Phone: (213) 740-0776.

Microbiology Laboratory Schedule

Unit	Wk	Date	Chapter	Laboratory	Lab Events
I	1	1/12-14	- 1 2	Lab Orientation Lab Fundamentals in Microbiology Spontaneous Generation of Microbes-TA	
	2	1/19-21	3 4 5 6	<i>Isolation of Microorganisms from the Environment/Manipulation of Cultures</i> Microscopy Determination of Bacterial Motility <i>Winogradsky Column</i>	
II	3	1/26-28	3 7 8 9	Macroscopic Observation of Microorganisms (from Environment)/ Manipulation of Cultures (cont'd) Preparation of Smears and The Gram Stain Endospore Stain Acid-Fast Stain	
III	4	2/2-4	7 - 9 10 11	Analysis of Stains (if necessary) <i>Nutrition and Growth of Bacteria</i> Anaerobic Culture Techniques	Chapter 3 Lab Report Due
IV & V	5	2/9-11	10 11	Nutrition and Growth of Bacteria (cont'd) Anaerobic Culture Techniques (cont'd)	
			12 13 14 15 16 17 18	Casein Hydrolysis Fat (Lipid) Hydrolysis Deoxyribonuclease Catalase Test Coagulase Test Hemolysin Production 6.5% NaCl Assay	
VI	6	2/16-18	12 13 14 16 17 18 19 20	Casein Hydrolysis (cont'd) Fat (Lipid) Hydrolysis (cont'd) Deoxyribonuclease (cont'd) Coagulase Test (cont'd) Hemolysin Production (cont'd) 6.5% NaCl (cont'd) Coliform Analysis Wine Production	Lab Exam 1
VII	7	2/23-25	19 21 22 23 24	Coliform Analysis (cont'd) Carbohydrate Fermentation IMViC Test Oxidase Test <i>API Unknown</i>	Chapter 10 Formal Lab Report Due Friday, 2/26, 5 pm
VIII	8	3/1-3	21 22 24	Carbohydrate Fermentation (cont'd) IMViC Test (cont'd) API Unknown (cont'd)	API Unknown Report Due
	9	3/8-10	25 26	<i>Bacterial Transformation</i> Carbohydrate Fermentation (cont'd) - Alkaline Swing Bacterial Transformation (cont'd) Ames Test for Detection of Chemical Carcinogenicity	

Labs in *blue italics* require Lab Reports.

Unit	Wk	Date	Chapter	Laboratory	Lab Events
	10	3/14-18	<i>Spring Recess</i>		
IX	11	3/22-24	26	Ames Test for Detection of Chemical Carcinogenicity (cont'd)	Chapter 25 Lab Report Due
			27	Antimicrobial Testing. The Kirby-Bauer Method	
			28	Effects of Commercially Available Disinfectants and Antiseptics	
			29	Lethal Effects of Ultraviolet Light	
X	12	3/29-31	27	Antimicrobial Testing. The Kirby-Bauer Method (cont'd)	
			28	Effects of Commercially Available Disinfectants and Antiseptics (cont'd)	
			29	Lethal Effects of Ultraviolet Light (cont'd)	
			30	Protists	
			31	Mycology - Introduction to Filamentous Fungi	
XI	13	4/5-7	32	The Cultivation and Enumeration of Bacterial Viruses	Lab Exam 2
			-	Review for Lab Final Exam	
XII	14	4/12-14	32	The Cultivation and Enumeration of Bacterial Viruses (cont'd)	
			33	ELISA	
	-	Review for Lab Final Exam			
	15	4/19-21	33	ELISA (cont'd)	
XIII	16	4/26-28		LAB FINAL EXAM (cumulative)	Winogradsky Column Lab Report Due