

BIMM 120 | Microbiology | Fall 2022

Professor Eric Allen

Tue/Thu 11:00 am – 12:20 pm, 108 Peterson Hall

	DATE	LECTURE TOPIC	TASKS
FUNDAMENTALS OF MICROBIAL BIOLOGY	Th Sep 22	1) Course Overview & Introduction to the Microbial World	<i>"Incoming Survey"</i> Mini-assignment
	Tu Sep 27	2) Cell Structure & Function Part I: Cell Walls & Membranes	<i>"Bacteria in the News!"</i> Mini-assignment
	Th Sep 29	3) Cell Structure & Function Part II: Other Structures & Inclusions; Biofilms	
	Tu Oct 04	*** Catch up day – finish Lecture 3 material....	<i>"Reflections on microbial toolboxes"</i> Mini-assignment
	Th Oct 06	4) Molecular Biology of Bacteria & Archaea	Quiz 1 = lectures 1 – 3
	Tu Oct 11	5) Microbial Differentiation, Regulation, & Sensing	<i>"My favorite microbe ♥"</i> Mini-assignment
	Th Oct 13	6) Genomics of Microorganisms Part I	Read Paper #1 <i>Homework 1 assigned</i>
	Tu Oct 18	7) Genomics of Microorganisms Part II	
	Th Oct 20	8) Mobile Genetic Elements & Horizontal Gene Transfer	Quiz 2 = lectures 4 – 7 <i>Homework 1 due</i>
	Tu Oct 25	9) Microbial Growth & Cell Cycle	<i>"HGT 4EVA"</i> Mini-assignment
MICROBES IN THE ENVIRONMENT	Th Oct 27	10) Microbial Trophic Dynamics: Carbon & Energy	
	Tu Nov 01	11) Metabolic Diversity I: Respiration & Fermentation	Quiz 3 = lectures 8 - 10
	Th Nov 03	12) Metabolic Diversity II: Photosynthesis	
	Tu Nov 08	13) Metabolic Diversity III: Chemolithoautotrophy	<i>"Astrobiology: life in the Universe"</i> Mini-assignment
	Th Nov 10	14) Microbial Ecology I: Microbial Species & Evolution	Quiz 4 = lectures 11 - 13 Read Paper #2
	Tu Nov 15	15) Microbial Ecology II: Biogeochemistry, Elemental Cycles	<i>"Microbes to the Rescue"</i> Mini-assignment
	Th Nov 17	16) Microbial Bioremediation	<i>Homework 2 assigned</i>
	Tu Nov 22	17) Metagenomics: Sampling the Unknown	Quiz 5 = lectures 14 – 16 Read Paper #3
	Th Nov 24	<i>Thanksgiving Break – No class!</i>	<i>Eat, sleep. Repeat.</i>
	Tu Nov 29	18) Symbiosis: Plant- & Animal-Microbe Interactions	<i>Homework 2 due</i>
	Th Dec 01	*** Catch up day (no new material)	
	We Dec 07	FINAL 11:30 AM – 2:30 PM	Quiz 6 = lectures 17 - 18

Course content: <http://canvas.ucsd.edu/> (syllabus, lectures, assigned papers, homeworks, IA docs, etc.)

Optional Textbook: “Brock Biology of Microorganisms” by Madigan *et al.* Any recent edition is acceptable: 12th ed. (2008), 13th ed. (2010), 14th ed. (2014), or 15th ed. (2017). *See textbook reading lists on attached pages below...*

CONTACT INFORMATION

Professor Eric Allen

Email: eallen@ucsd.edu

Office Hours: Fridays 3:00 – 4:00 pm <[Zoom link](#)> -or- email to schedule

Office: 4170 Hubbs Hall (Scripps Institution of Oceanography campus)

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Instructional Assistants

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Office Hours (details available on Canvas)

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TBD

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Tuesdays 3-4 pm <[Zoom link](#)>

Calvin Wang

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TBD

Discussion section times (Zoom links available on Canvas):

Section	Section ID	Time	Location	IA
A01	92979	Mon 8 - 8:50 am	HSS 2321	Gabrielle
A02	92980	Mon 10 - 10:50 am	CENTR 220	Gabrielle
A03	92981	Mon 5 - 5:50 pm	HSS 2321	Lucas
A04	92982	Mon 6 - 6:50 pm	HSS 2321	Lucas
A05	92983	Mon 7 - 7:50 pm	HSS 2321	Wanying
A06	92984	Mon 8 - 8:50 pm	HSS 2321	Wanying
A07	92985	Thu 5 - 5:50 pm	HSS 2321	Aditi
A08	92986	Thu 6 - 6:50 pm	HSS 2321	Aditi
A09	92987	Fri 8 - 8:50 am	HSS 2321	Calvin
A10	92988	Fri 5 - 5:50 pm	HSS 2321	Kalle
A11	92989	Fri 6 - 6:50 pm	HSS 2321	Kalle

Attendance at Discussion Section will be not be taken and you are not required to attend. However, you will find regular attendance to be highly beneficial as the IA's will answer questions about the lectures, papers, and required readings AND they will present discussion material that will be GRADED (participation points). These “mini-assignments” will be discussed in discussion sections but do require that you be in attendance live.

Sections will start the week of Monday Sep 26th (week 1)

Grading:

There will be six quizzes scattered through the quarter, each worth 60 points, but only your five highest scoring quizzes will count. In this scenario, you may opt to skip one quiz or not take the final quiz during finals week if you are already satisfied by your score/grade in the course. Quizzes will consist of multiple choice and short answer questions, with questions taken directly from the lectures and assigned required readings. All quizzes will be administered asynchronously. You will have 45 minutes to one hour (or more) to complete a quiz in Canvas once you start (timed). The

five highest scoring quizzes are worth a total of 300 points. In addition, there will be two written homework assignments, each worth 50 points (see description below). There will also be a number of “mini-assignments” that constitute evidence of your participation in the course. These include short assessments given in discussion section, completion of polls, etc. and is worth a total of 100 points. In sum, 500 total points are up for grabs in this course. Final grades will be based on quiz scores, homework assignments, and “participation”.

	Points	% of grade
Quizzes (5)	300	60%
(Mini) Assignments & Participation	100	20%
Homework 1	50	10%
Homework 2	50	10%
	500	100%

Your final grade will be based on the total number of points you receive. The class will not be graded on a curve UNLESS this would benefit the entire class and will be determined late in the quarter.

100 - 98%	A+	97 - 93%	A	92 - 90%	A-
89 - 87%	B+	86 - 83%	B	82 - 80%	B-
79 - 77%	C+	76 - 73%	C	72 - 70%	C-
69 - 67%	D+	66 - 63%	D	62 - 60%	D-
		<60%	F		

Readings from the textbook are recommended but are not required. Topics covered in the recommended textbook readings, but not covered in class, will NOT be on the quizzes....

Homework written assignments (50 points each; 100 points total):

For the homework assignments, you will be given a few questions or tasks and asked to write a short report. Your answer(s) to these assignments should occupy approximately 1 page (it is okay if more than one page but please be concise). The questions will be posted on Canvas along with the due date (one week following the date assigned). Be sure to provide references to the source material (primary literature) used to obtain your answers!

Mini-assignments & Participation (10 points each; 100 points total):

Most weeks will include a brief mini-assignment that will require you to do some simple on-line or literature searches and write 2-3 sentences about your findings -or- you will be asked to provide comments on a question(s). These should be easy and take no longer than 15 minutes to complete. There are no right or wrong answers so if you complete the assignment on time, you will get full credit! These assignments will be published on Mondays and you will have until Friday at 11:59pm to complete them (approximately four days). Please do not submit your assignments late! One day late, i.e. submission on Saturday, will result in a 50% deduction in points (5 points); submission on Sunday will result in an 80% reduction in points (2 points); submission on Monday will be 0 points. These are easy so just get 'em done!

Course Website

The Canvas course site contains links to video lectures, required readings (i.e., primary research articles), assignments, and quizzes. There will be three primary research articles that you will be required to read and understand (see course calendar for assignment dates). Why more reading? Well, microbiology is a highly dynamic science. Many exciting and important findings have yet to find their way into the textbooks which is why we turn to the primary research literature. Not only is reading papers fun but the correct approach to scientific literature can be a very rewarding experience. The materials/methods sections will provide you a ‘train of thought’ as to how the experiments were conducted/conceived (“how did they do that?”) and critical reading of the paper will allow you to evaluate whether or not the results justify the conclusions (“why did they do that?”). These papers will provide a more thorough picture of modern microbiology. The papers will be introduced in class on the lecture date they are assigned and discussed further in your next section meeting. Questions from the assigned papers will appear on the quizzes!

Useful websites:

PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/> (journal literature portal)

Google Scholar: <https://scholar.google.com/> (journal literature portal)

Small Things Considered: <http://schaechter.asmblog.org/schaechter/> (odds and ends from the microbial world)

Microbe wiki: <http://microbewiki.kenyon.edu> (great resource for exploring a rich variety of microorganisms)

General guidelines for reading the research papers:

Familiarize yourself with related topics: Read the related material in the textbook to familiarize yourself with the subject matter. Research papers are written for people who already know something about the subject matter.

Try to answer the following questions as you read the required papers:1. What questions were addressed in this paper?

Frequently the introduction (or the first few paragraphs of Science and Nature articles) will present background information and raise the questions that will be addressed in the paper.

2. What were the main conclusions from the paper?

The main conclusions will be summarized in the abstract and further discussed in the discussion section. Why were these conclusions important?

3. What experiments were performed to answer these questions?

These will be briefly summarized in the abstract, sometimes also in the discussion (or the last few paragraphs of science or nature papers), and will be discussed at length in the results section of the paper.

4. For each experiment:

What conclusion did the experiment allow? What were the caveats of each experiment? (i.e., were there alternative explanations?) What experiments ruled out these alternatives?

Read the assigned papers before attending lecture and sections and ask your IA any questions you may have. If questions remain, attend either your IA's or Dr. Allen's office hours.

To prepare for the quizzes:

1. Attend the lectures or watch the recorded versions! *ALL questions will come directly from the lectures and assigned papers.*
2. Read the papers! *Both the midterm and final exam will have questions about the papers; these questions will require that you understand the experiments and what conclusions they reveal.*
3. Attend section regularly, as you will be able to ask questions about the lectures and papers.
4. Read the related material in the optional textbook (note: the suggested reading assignments will always follow from section-to-section within a chapter; if you have any questions ask your IA). *These readings will reinforce the lectures and provide additional information that you will find useful.* Also don't be afraid to do extra reading to understand the material. Ultimately, if you understand the concepts you are in a much better position to answer the questions!
5. Do not cheat! *Disciplinary steps will be taken when cheating is discovered. These steps may include failing the class and being reported to the appropriate authorities.*

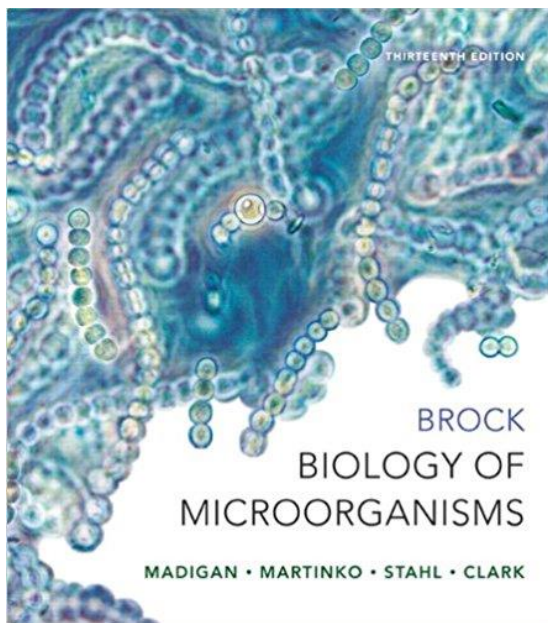
Based on prior experience, the students who do best in this class attend the lectures and sections, and read the papers before attending section. Make this be YOU!

*****IMPORTANT MESSAGE ON ACADEMIC INTEGRITY*******Statement of Academic Integrity:**

Academic Integrity is expected of everyone at UC San Diego. This means that you must be honest, fair, responsible, respectful, and trustworthy in all of your actions. Lying, cheating or any other forms of dishonesty will not be tolerated because they undermine learning and the University's ability to certify students' knowledge and abilities. Thus, any attempt to get, or help another get, a grade by cheating, lying or dishonesty will be reported to the Academic Integrity Office and will result sanctions. Sanctions can include an F in this class and suspension or dismissal from the University. So, think carefully before you act by asking yourself: a) is what I'm about to do or submit for credit an honest, fair, respectful, responsible & trustworthy representation of my knowledge and abilities at this time and, b) would my instructor approve of my action? You are ultimately the only person responsible for your behavior. So, if you are unsure, don't ask a friend—ask your instructor, instructional assistant, or the Academic Integrity Office. You can learn more about academic integrity at academicintegrity.ucsd.edu (Source: Academic Integrity Office, 2018) (Translation: Be cool!)

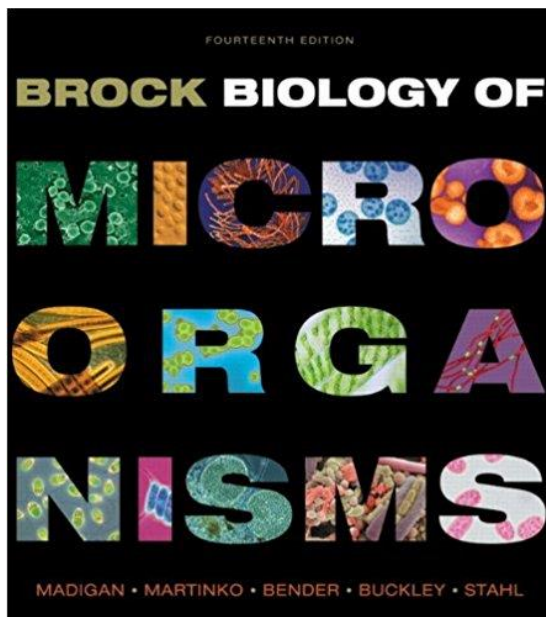
Brock Biology of Microorganisms 13th Edition

Lecture 1 – Introduction: 1-10, 34-36, 454-467
Lecture 2 – Cell Walls & Membranes: 48-64
Lecture 3 – Cell Structures & Inclusions: 64-81, 133, 674-676
Lecture 4 – Molecular Biology: 151-157, 170-174, 192-197
Lecture 5 – Differentiation & Sensing: 210-223, 226-231
Lecture 6 – Microbial Genomics I: 314-323, 327-333
Lecture 7 – Microbial Genomics II: 314-323, 327-333
Lecture 8 – Mobile Elements & HGT: 159-162, 273-281, 286-288, 333-336
Lecture 9 – Growth & Cell Cycle: 118-132
Lecture 10 – N/A
Lecture 11 – Trophic Dynamics: 86-90, 92-98, 106-108
Lecture 12 – Respiration & Fermentation: 98-101, 373-377, 381-388, 390-394, 395-397
Lecture 13 – Phototrophy & Other Autotrophies: 341-354, 354-358, 361-367
Lecture 14 – Phototrophy & Other Autotrophies: 341-354, 354-358, 361-367
Lecture 15 – Microbial Species & Evolution: 447-452, 467-470
Lecture 16 – Microbial Biogeochemistry: 670-673, 699-709
Lecture 17 – Microbial Bioremediation: 713-717
Lecture 18 - Metagenomics: 649-658
Lecture 19 – Plant and Animal Symbioses: 723-730, 732-741, 745-749
Lecture 19 – Microbiomes: 793-796
Lecture 20 – N/A



Brock Biology of Microorganisms 14th Edition

Lecture 1 – Introduction: 1-12, 355-363, 369-376
Lecture 2 – Cell Walls & Membranes: 32-47
Lecture 3 – Cell Structures & Inclusions: 48-63, 159, 602-605
Lecture 4 – Molecular Biology: 108-115, 120-127
Lecture 5 – Differentiation & Sensing: 216-230
Lecture 6 – Microbial Genomics I: 183-193, 198-205
Lecture 7 – Microbial Genomics II: 183-193, 198-205
Lecture 8 – Mobile Elements & HGT: 208-211, 299-307, 310-311
Lecture 9 – Growth & Cell Cycle: 144-158
Lecture 10 – N/A
Lecture 11 – Trophic Dynamics: 74-85, 95-96
Lecture 12 – Respiration & Fermentation: 86-89, 401-424
Lecture 13 – Phototrophy & Other Autotrophies: 380-400
Lecture 14 – Phototrophy & Other Autotrophies: 380-400
Lecture 15 – Microbial Species & Evolution: 348-352
Lecture 16 – Microbial Biogeochemistry: 598-602, 632-642
Lecture 17 – Microbial Bioremediation: 645-647, 650-657
Lecture 18 – Metagenomics: 204-206, 579-587
Lecture 19 – Plant and Animal Symbioses: 672-679, 682-691, 696-699
Lecture 19 – Microbiomes: 706-712
Lecture 20 – N/A



Brock Biology of Microorganisms 15th Edition

Lecture 1 – Introduction: 1-11, 26-29, 364-376
Lecture 2 – Cell Walls & Membranes: 35-47
Lecture 3 – Cell Structures & Inclusions: 48-64, 620-624, 152
Lecture 4 – Molecular Biology: 103-108, 115-119
Lecture 5 – Differentiation & Sensing: 174-188, 192-196
Lecture 6 – Microbial Genomics I: 242-251, 257-265
Lecture 7 – Microbial Genomics I: 242-251, 257-265
Lecture 8 – Mobile Elements & HGT: 108-109, 313-323, 325-328, 254-256
Lecture 9 – Growth & Cell Cycle: 138-151
Lecture 10 – N/A
Lecture 11 – Trophic Dynamics: 74-84, 94-96
Lecture 12 – Respiration & Fermentation: 85-91, 419-425, 427-431, 434-438, 441-443
Lecture 13 – Phototrophy & Other Autotrophies: 393-410, 413-416
Lecture 14 – Phototrophy & Other Autotrophies: 393-410, 413-416
Lecture 15 – Microbial Species & Evolution: 364-370, 382-384
Lecture 16 – Microbial Biogeochemistry: 615-620, 652-662
Lecture 17 – Microbial Bioremediation: 666-670, 673-680
Lecture 18 – Metagenomics: 257-259, 595-604
Lecture 19 – Plant and Animal Symbioses: 700-709, 714-718, 721-726
Lecture 19 – Microbiomes: 730-740
Lecture 20 – N/A

