MCB4320C: The Microbiome

Spring, 2026
Online Asynchronous, 3 credit hours

Instructors

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Office hours by appointment on Zoom
We will always be available to answer questions by email or set up an individual phone or Zoom conversation. Just contact us to arrange it.

Teaching Assistants

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Course Description

Environmental microbiologists began the study of uncultured microbial life in the early 1990s. The idea was to start to understand the breadth of microbial diversity across a wide variety of habitats using methods that do not require culturing of the organisms. Environmental microbiologists took full advantage of new genetic tools and found diverse life in many places. By about 2005, those outside of microbiology began to take notice of these new tools and became interested in discovering microbes associated with their environments of interest. This has led to a sea of papers investigating the collection of microbes associated with eukaryotes.

The collection of microorganisms that inhabit a specific environment, their genomes (i.e., genes), and the surrounding environmental conditions are referred to as the microbiome. The microbiome includes all microbial life: bacterial, archaeal, fungal, and viral. Microbiomes exist on and within plants, animals, insects, amphibians, birds, etc. They also live in niches to themselves in a wide variety of terrestrial, marine, and aquatic environments. Many of these environments are extreme, including hot springs, deep ocean thermal vents, and subsurface rock formations. Given the many environments in which microbiomes thrive, no single course or group of courses can hope to cover them adequately. However, this course intends to teach students how microbes are associated with different niches, including humans, animals/insects, plants, soils, water, and polluted environments. Guest speakers may be invited for a Q&A on certain topics. Since there are no exams in this course, the weekly content will be assessed in proctored quizzes (e.g., multiple-choice, multiple-answer, short response) and other assignments.

Course Learning Objectives

1. Students will be able to understand what the microbiome is and the principles that drive microbial life in different niches.
2. Students will be introduced to how microbial omics data is used to understand the human microbiome and its role in human health.
3. Students will be introduced to the modern technologies used in microbiome research. By understanding the technologies, the students can learn which biological questions can be asked and answered given today's tools.

Course Overview and Purpose

The course will be **entirely web-based,** and all lectures will be delivered online asynchronously. The reading assignments and course lecture materials will be posted weekly.

Course Prerequisites

This course has introductory microbiology (MCB 3020 or MCB 3023 or equivalent) as a prerequisite with a minimum grade of C and is intended for majors in the Life Sciences. It will be taught at the senior level, and its primary objective is to increase microbiome knowledge and appreciation.

Textbooks, Learning Materials, and Supply Fees

Knowing that the high cost of instructional materials can be a burden for students, this course has been designed around affordability. Our course relies entirely around open educational resources, library resources, and academic articles to provide students with an affordable yet academically rigorous learning experience and ensure that all our students to access the resources they need to be successful in their learning. Accordingly, our course has earned **the Affordable UF designation** and the ZTC (zero textbook cost) badge, recognizing sections of courses that "go above and beyond in affordability by having no other costs beyond tuition and fees for the course" by the UF Center for Teaching Excellence.

Some on-campus students may have a $10 distance learning fee applied for Honorlock proctoring. Consistent with UF policy, **students are expected to have ongoing computer and internet access**. The Student Computing Requirements state: "The University of Florida requires all students to have continuous ongoing access to computer hardware and software appropriate to their degree program. Coursework in all degree programs requires the use of a computer and reliable high-speed internet connectivity. Activities related to student life including academic advisement, course registration, official university correspondence, use of library resources, and student financial affairs are predicated on access to a computer with internet connectivity." For more information, please see: https://policy.ufl.edu/policy/student-computing-requirements/.

There is no textbook for this course. All required readings and works will be made available in Canvas.

Required Technology & How to Obtain the Technology

A physical keyboard and pointing device are necessary; students should not relay entirely on a touchscreen device. Network connectivity is required. A webcam is required for proctored quizzes.

Late assignments will not be accepted due to technical errors or malfunctions.

Computing labs are available on campus at these locations: https://cals.ufl.edu/current-students/studentresources/computer-lab/.

Digital information literacy skills

Not all published literature is open access. Some required readings may require log-in via Gatorlink with a VPN. You can download such articles using off-campus access through UF libraries, with instructions here: https://uflib.ufl.edu/using-the-libraries/off-campus-access/.

Class Demeanor/Expectations

Be respectful and kind in all communications to faculty, advisors, and your fellow students. Learners are expected to communicate online with the instructor and fellow students, whether the communication is by electronic means or by telephone or face-to-face, with civility, transparency, and poise. We expect students to be receptive to and sensitive to cultural differences.

Please review UF's Netiquette Guide for Online Courses here. We expect you to read "Email Etiquette", "Message Board Netiquette and Guidelines" in its entirety. **The Take-Home message is: Be open. Be considerate. Be respectful.** We call your attention to these points especially:

- **Community Guidelines:** Assume your professors and advisors have your best interest in mind and will work within the bounds of what is appropriate and possible to help you.
- **Tone:** "Avoid devolving to the use of snarky, exaggerated, or expletive language if you become frustrated." Refer again to the UF Honor and Student Conduct Code.
- **Security:** "Do not share your password with anyone."
- **Instructor Emails:** Use clear and concise language. Use a descriptive subject line.
- **Message Board:** "Make posts that are on-topic and within the scope of the course material. Take your posts seriously and review and edit your posts before sending. Always give proper credit when referencing or quoting another source. Do not repeat someone else's post without adding something of your own to it. Avoid short, generic replies such as, "I agree." You should include why you agree or add to the previous point. Do not make personal or insulting remarks."

Technical Support

UF Computing Help Desk & Ticket Number: All technical issues require a UF Helpdesk Ticket Number. The UF Helpdesk is available 24 hours a day, 7 days a week. https://helpdesk.ufl.edu/ | 352-392-4357

Weekly Course Schedule

The course is structured as 12 lessons or modules – one each week of the semester. Each week will cover a different topic. The topics are built on each other, so to understand a topic in week 6, for example, it is necessary that you understand the material from week 1. The first 4 weeks of the course lay the foundation for the remaining weeks.

Each week begins on Tuesday, which is the day by which a new week's worth of material will be posted. Every effort on our part will be made to post material prior to Tuesdays, but that may not always happen. The week's material will *typically* be released by 5 PM EST. This course is not built to work "at your own pace" – each week is intentionally released as we go, by design.

After you go through the material in the order presented, you are always free to return and visit any of the content. Topics and Sequence are subject to change at the instructors' discretion.

Please Note… Students are expected to check Canvas regularly and are encouraged to log onto Canvas every Tuesday evening (EST) so they can get ahead with the weekly material and, at a minimum, understand what is required of them that week. Deadlines are final, to ensure consistent student progress and that each student can fulfill requirements in alignment with the course sequence.

Module	Dates	Topics and Assessments for the Week:
1	Jan 13	Course Orientation History of the study of the microbiome
2	Jan 20	The great plate anomaly Next generation sequencing (platforms and uses) **Quiz 1 opens** (Mods 1-2)
3	Jan 27	Generating and interpreting 16S rRNA and metagenomic data
4	Feb 3	Scientific Literacy Practical applications and considerations in microbiome data **Quiz 2 opens** (Mods 3-4)
5	Feb 10	Gut microbiome and infant health case study
6	Feb 17	Selected topics in the human microbiome in health and disease **Quiz 3 opens** (Mods 5-6)
7	Feb 24	Selected topics in the animal microbiome
8	Mar 3	Selected topics in the soil microbiome **Quiz 4 opens** (Mods 7-8)
9	Mar 10	Metagenomics and culturing
10	Mar 24	Selected topics in the water microbiome **Quiz 5 opens** (Mods 9-10)
11	Mar 31	Selected topics in the plant microbiome (building on soil microbiome)
12	Apr 7	The microbiome in polluted environments and bioremediation
13	Apr 14	**Quiz 6 opens** (cumulative)

Grading Policy

Course grading is consistent with UF grading policies.

Course Grading Structure

Assignment	Requirements	%
Quizzes/ Assignments (6 total - drop the lowest score)	Series of 6 lecture-based modules. **Students may drop the 1 lowest scoring** assignment, thus the highest scoring 5 assignments will count. Homework quizzes / assignments that assess understanding of concepts and critical thinking. Homework will assess specific learning objectives primarily through auto-graded multiple-choice/multiple-answer, fill in the blank, etc. questions. In some cases, brief case studies with open-text responses, short essays, or other formats may be used to apply concepts and tools. At least one quiz this semester will be hands-on and require either the use of data analysis tools you've learned about or your critical analysis of the literature (the hands-on quiz cannot be dropped).	80%
Reflections	A series of 4 written reflections on your progress and what you have learned in the field (1 to 1 ½ page).	20%
TOTAL		**100%**

Quizzes (varied format)

All quizzes are timed, open-book, and proctored through Honorlock. Each quiz may be taken up to three times, and your highest score will be recorded. Quiz questions may vary with each attempt. A quiz cannot be reopened or reset due to technical issues. Please note: A slow or unstable internet connection may affect timed quizzes; it is your responsibility to use a connection that meets the speed requirements listed on the e-Learning homepage.

Quizzes close at 11:59 PM EST on the stated due date, regardless of whether you have completed the quiz. The lowest quiz grade of the six quizzes will be dropped; however, one hands-on analysis quiz cannot be dropped. If you are satisfied with your performance on the first five quizzes, you are not required to take the sixth (final) quiz.

Following the close of each quiz window, you have 10 calendar days to contest your quiz grade by email. (For example, you may not request a correction to Quiz 2 during the last week of the course.) You are welcome to discuss any quiz question at any point in the semester for learning purposes, but requests for grade changes must include a clear justification of your answer. For instance, instead of writing “tell me why I am wrong,” please explain why you believe your response is correct or equally appropriate.

Quizzes open on Fridays and remain available for one full week, closing the following Friday, to provide flexibility with scheduling.

Reflections (written)

At three points in the semester, you will be asked to submit a 1 to 1 ½ page reflection. Thoughtful reflections that fully and authentically address the prompts will receive full credit. Where indicated, specific evidence from the lectures or reading materials should be used to support your responses.

Late Work Policy

If we accept a late submission on a particular assignment, this will be made known to students in advance, i.e., when the assignment is released. Under this policy, such an assignment can be submitted up to two days late, with a 10% late deduction each day. Given the built-in flexibility, quizzes cannot be accepted late.

Grading Scale

For information on how UF assigns grade points, visit: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Grade	Percentage
A	93.0 – 100%
A-	89.0 – 92.99%
B+	86.0 – 88.99%
B	82.0 – 85.99%
B-	79.0 – 81.99%
C+	76.0 – 78.99%
C	72.0 – 75.99%
C-	69.0 – 71.99%
D+	66.0 – 68.99%
D	62.0 – 65.99%
D-	59.0 – 61.99%
S	<59.0

Academic Policies and Resources

Academic policies for this course are consistent with university policies. See https://syllabus.ufl.edu/syllabus-policy/uf-syllabus-policy-links/

Campus Health and Wellness Resources

Visit https://one.uf.edu/whole-gator/topics for resources that are designed to help you thrive physically, mentally, and emotionally at UF.
Please contact UMatterWeCare for additional and immediate support.

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Privacy and Accessibility Policies

[required for online courses, list all technology used]

- Instructure (Canvas)
    - Instructure Privacy Policy

    - Instructure Accessibility
- Zoom
    - Zoom Privacy Policy
    - Zoom Accessibility