

Prokaryotic Diversity — MCB 4150/6151 — Summer C 2023

Course Syllabus

Instructor

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Co-Instructor

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Office hours

By appointment and via Zoom

Preferred method for communication with the instructors

Email with the subject “MCB 4150” (undergraduate students) or “MCB 6151” (graduate students)

Delivery method

Online

Credits and prerequisites

Three. Undergraduates require MCB 3020 or MCB 3023 with minimum grades of C.

Course description

This course is an introduction to the diversity of the *Bacteria* and *Archaea*. Content will provide a conceptual and historical framework for understanding their 1) origin and evolution; 2) morphological, metabolic, and molecular characteristics; 3) genetic and physiological diversity; 4) importance in human/animal/plant health; and 5) roles in elemental cycling.

Course objectives/goals/learning outcomes

The specific objectives of this course are to expose students to the following topics:

- Origin, evolution, and genetic diversity of microbial life;
- Physiological diversity of metabolic and bioenergetic pathways;
- Microbial species and speciation;
- Phylogenetic and functional analysis of (meta)genomic data;
- Characterization of uncultivated microbial lineages; and
- Linkage between microbial diversity, function, and ecology.

Course material and assignments

Assignments: Instructions for and submission of assignments will be through Canvas (<http://elearning.ufl.edu/>)

Exams: There will be 2 exams and a cumulative final exam. Undergraduate exams will consist of multiple choice questions. Graduate exams will consist of multiple choice (40%), short answer (30%), and essay (30%) questions.

Written assignment: Undergraduate students must submit a critical analysis of a research paper focusing on some aspect of bacterial or archaeal biology; graduate students have different requirements (see below). Submit your research topic through Canvas and by **21 June 2023**. The assignment is due on **24 July 2023** and must be submitted through Canvas. Detailed information on the requirements are specified in the assignment guidelines.

Quizzes: There will be 12 practice quizzes administered throughout the semester (four given during each exam period). Each quiz will consist of 5 to 6 multiple choice questions, students are given 15 minutes to complete the quiz, and they will be available until the start of the exam period for the material. The quiz grade (3% of the final grade) will be based on a student's 10 best scores (i.e., the two lowest scores are dropped). *There will be no opportunities to extend the period over which a quiz can be completed for course credit.*

Additional requirements for graduate credit (MCB 6151): Graduate student exams will be more rigorous (e.g., 60% short answer and essay questions) and be graded on different standards from those designated for undergraduate students. Graduate students are also required to submit a research paper of at least 5 pages in length. The paper should focus on a specific topic in prokaryotic diversity (more detail is provided in the assignment guidelines). To obtain a passing grade (i.e., C or higher), graduate students must accrue at least 73% of the possible points in the course.

Participation: Students are expected to participate in the online discussions during each week of the course.

Recommended textbook and required research articles

Readings will be assigned from *Brock Biology of Microorganisms* (BBOM; Madigan, M.T., K.S. Bender, D.H. Buckley, W.M. Sattley, and D.A. Stahl., Pearson). Any of the following BBOM editions are acceptable for this course: 16th, 15th or 14th.

There are assigned supplemental readings of scientific research articles for certain modules that will be available for download from Canvas. Scientific research papers will be assigned and discussed in this course. These materials will be made available to students through the Canvas e-Learning site (<http://elearning.ufl.edu/>).

Course topics by module

1. Introduction
2. The early history of microbiology
3. Early perspectives on microbial diversity
4. Molecular microbial diversity
5. Microbial evolution
6. Species and speciation
7. Bioenergetics: unity in diversity
8. Overview of the Bacteria and Archaea

9. Proteobacteria and chemolithotrophy
10. SAR11: a proteobacterial clade that dominates the biosphere
11. Even more about the Proteobacteria!
12. Anoxygenic photosynthetic bacteria
13. Oxygenic photosynthetic bacteria
14. Firmicutes, Actinobacteria, and Tenericutes
15. Bacteroidetes
16. Spirochetes
17. Chlamydiae, Planctomycetes, and Verrucomicrobia
18. Deinococcus - Thermus
19. The bacterial 'Candidate Phyla Radiation' (CPR)
20. Thermophiles and hyperthermophiles
21. Methanogens
22. Haloarchaea
23. TACK superphylum
24. Lokiarchaeota and the Asgard superphylum

Exam administration – Honorlock

The exams are proctored through Honorlock. To prepare for an online exam proctored by Honorlock, read the Student Exam Preparation Information handout

(<https://dce.ufl.edu/media/dceufledu/pdfs/Honorlock-Student-Exam-Preparation-Information.pdf>).

Prior to the exam, make sure that you have the Chrome web browser and the Honorlock Chrome extension (<https://static.honorlock.com/install/extension>) installed.

Evaluation of learning/grades

Overall grading percentages:

Exam 1	24%
Exam 2	24%
Final Exam	24%
Written assignment	20%
Participation	5%
Quizzes (10 highest scores)	3%

Materials and supplies fees

There are no additional fees for this course.

Grading policy

A	93-100%
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%

C+	77-79%
C	73-76%
C-	70-72%
D+	67-69%
D	63-66%
D-	60-62%
E	Below 60%

Additional information on grades and grading policies:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Make-up policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>.

Students requiring accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://disability.ufl.edu/>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible and *submit their accommodations to the instructor during the first week of the semester*.

Campus resources

Resources are available on campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. These resources include:

Health and wellness

- U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.
- Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575;
- Sexual Assault Recovery Services (SARS) at the Student Health Care Center, 392-1161.
- For emergencies call: University Police Department, 392-1111 (or 9-1-1 for emergencies). <http://www.police.ufl.edu/>

Academic resources

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.
- Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <http://www.crc.ufl.edu/>
- Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <http://teachingcenter.ufl.edu/>

- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>

Course evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.a.a.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.a.a.ufl.edu/public-results/>.

Class demeanor

Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all. Contact the instructor immediately if you experience any problem which prevents you from performing satisfactorily in this class.

Netiquette guide for online courses

It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette.

<https://teach.ufl.edu/wp-content/uploads/2020/04/NetiquetteGuideforOnlineCourses.docx>

University honesty policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Additional comments regarding academic integrity

Students are encouraged to discuss material with each other from the course, help each other understand concepts, study together, and even discuss assessment questions with each other once the window is closed. However, the following are considered academic dishonesty and no student should ever do any of the following:

- Have another person complete an exam in this course.
- Copy another student’s exam in this course.
- Collaborate with anyone during an exam in this course.

- Discuss the questions and answers of an exam with other students while the quiz window is still open.
- Manipulate and/or distribute any materials provided in this course for any purpose (including course lecture slides).
- Use any materials provided by a previous student in the course.

A research paper *in your own words* is required for partial fulfilment of this course and all of the following are considered plagiarism (from <http://www.plagiarism.org>):

- Turning in someone else's work as your own.
- Copying words or ideas from someone else without giving credit.
- Failing to put a quotation in quotation marks.
- Giving incorrect information about the source of the information.
- Changing words but copying the sentence structure of a source.
- Copying so many words or phrases from a source that it makes up the majority of your work, whether you give credit or not.

Plagiarized work is easily detected and university regulations on academic misconduct will be strictly enforced.

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.

Microsoft Office 365 software is free for UF students

<http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/>

Other free software is available at:

<http://www.software.ufl.edu/>

To check for availability of the media and technical requirements, contact the UF Computing Help Desk at (352)392-HELP(4357).

University of Florida complaints policy and student complaint process

Most problems, questions and concerns about the course can be resolved by professionally communicating with the instructor.

The University of Florida believes strongly in the ability of students to express concerns regarding their experiences at the University. The University encourages its students who wish to file a written complaint to submit that complaint directly to the department that manages that policy.

If a problem really cannot be resolved by communicating with the instructor or the TAs you can contact:

- Residential Course: <https://sccr.dso.ufl.edu/>.
- Online Course: <http://www.distance.ufl.edu/student-complaint-process>.

This said, professionalism is a two-way-street. Unprofessional behavior of students includes, among other things: lack of communication, blaming other people or external factors, lying, affecting others negatively in a group or in the class, not accepting criticism and not being proactive in solving problems or seeking help. Furthermore, faculty often have family and other obligations to tend to. Hence, over the weekend replies to your inquiries or questions may be delayed.

If a student is lacking professionalism repeatedly, the instructor has the right to file formal complaint against the student through the Dean of Student office.