General Microbiology Lecture/BMS 503

Spring 2025

Instructor: Dr. Kyle MacLea, Associate Professor
Office: room 559 and Lab room 560/560C
Contact: Kyle.MacLea@unh.edu (preferred contact method)
(603) 641-4129 (office), 603-815-1556 (cell)
Responses: Will be made within 48 hours if at all possible
Office hours: Always by appointment as well as Mondays 12pm-2pm. Usually in my office (Room 559) or lab (Room 560/560C) but may occasionally move to other campus locations or online with notice (or a note on my door). Email is the easiest way to reach me, but if I am in my office, feel free to stop by! You may also text me at the number above in emergencies.
Primary tutor: Fatoumatta Jallow Fatoumatta.Jallow@unh.edu

Course: General Microbiology, BMS 503, 3 credits
University requirements met: none
Modality: in-person face-to-face; occasional scheduling issues including curtailment due to snow may require a shift to virtual modality for a session
Time and Place: Mondays and Wednesdays 10:10am-12pm in Room **380 Pandora Bldg**.
Department: Dept. of Life Sciences, UNH Manchester, College of Professional Studies
Programs: B.A./A.S. in Biological Sciences; B.S. in Biotechnology
Prerequisites: BIOL 413 or 411 or BMS 507; CHEM 403 plus 404 or 405

Course description: Principles of microbiology; morphology, physiology, genetics, culture, and classification of bacteria and other microorganisms; relationships of microbes to agriculture, environment, industry, sanitation, and infectious diseases.

Format: BMS 503 is the Lecture course, BMS 504 is the Laboratory course (2 credits). In most cases, these courses must be taken together. A separate syllabus will describe the 504 course in detail. Your grades will be separate for the two courses. See your lab instructor for the lab syllabus and how your grade will work in BMS 504.

Student Learning Objectives: Students who successfully complete this course will be able to:

1. Compare and contrast the structures of cellular and non-cellular microbes.
2. Discuss basic structure-function relationships of microbial cell components, and explain how specific microbial components contribute to a microorganism's growth and survival.
3. Understand the principles of microbial genetics, including how genetic information is maintained and transferred, how mutation can effect viability and contribute to evolution, and how gene expression is regulated.
4. Describe the basic metabolic pathways that allow microorganisms to grow, thrive, and survive in numerous environments
5. Discuss the role of microorganisms in human and animal health and explain, using specific examples, how microbes can be both harmful and beneficial.
6. Give examples of the use of microorganisms in biological and chemical processes that benefit humans

General Microbiology Lecture/BMS 503

Course objectives: The purpose of this course is to provide the student with a general knowledge of Microbiology as it relates to Biology, Biochemistry, Plant and Animal Sciences, Environmental Science and Medicine. Staining techniques, isolation techniques, and identification of microorganisms constitute a significant portion of the laboratory component. Although this is an introductory course in Microbiology, students are expected to have some background in Biology and Chemistry as described in the prerequisite listing above. This course is a preparation for entry into advanced Microbiology courses and for Biology, Biotechnology, and all other majors requiring this course. The specific sequence of expected readings, assignments, and lectures, will follow this assignment.

Key concepts: Structure and function of microbes and microorganisms, microbial nucleic acid structure and regulation, microbial physiology and metabolism, interactions of microbes in the environment and as causes of health and disease, control of microbial growth and interactions with the human immune system.

Credit Hour Policy: This syllabus reflects the federal definition of a credit hour, which entails a minimum 3 hours of engaged time per week per credit over a 15-week semester. Examples of engaged time include class time, assignments, examinations, laboratories, participation in course-related experiences (attending a talk or performance, speakers and events, fieldwork, etc.), conferences, and office hours. Student work reflects intended learning outcomes and is verified through evidence of student achievement. For more information, please see NECHE's Policy on Credits and Degrees.

Types of Assessments Used: Writing assignments (online), In-class research activities with written output (in person in class), and Exams (in person in class).

Grading Procedure and Scale: Students will earn points based on the assessment point breakdown below. The percentage earned out of the total available points will be compared to the standard UNH grading scale to assign the final course grade for BMS 503.

Lecture Grading Scheme (separate from your grade for lab in BMS 504):

3 lecture exams @ 100 points each in class.....	300
Vaccination Activity in class	100
Epidemiology Activity in class	50
Microbe of the Day online	50
Getting to know you assignment online	10
Total Points Available.....	510

Exams: Exams are non-cumulative over detail questions, but broad concepts previously tested are always fair-game. All exams must be taken when scheduled. Make-up exams will be permitted only for excused absences (*e.g.,* confirmed illness with doctor's note, described below under Core Course Expectations) and advance notice of absence where possible. Each exam only covers material since the previous exam; *i.e.*, the second and third exams are not

cumulative. Each exam will have a similar structure and be comprised of multiple choice, short, and long answer questions. More detail on this structure will be given in class.

Textbook: THE TEXTBOOK IS FREELY AVAILABLE ONLINE AS A PDF, OR A PRINT COPY MAY BE PURCHASED. *OpenStax Microbiology,* Parker *et al.,* 2016.

You can purchase a (cheap) print version, if you prefer, via various online sources or from OpenStax. You can use whichever format or formats you want. Web view ("View Online") is recommended -- the design works seamlessly on any device. There is also an OpenStax app, or you can read on iBooks, Kindle, Nook, or Chegg. If you buy on Amazon, make sure you use the link on your book page on openstax.org so you get the official OpenStax print version. (Simple printouts sold by third parties on Amazon are not verifiable and are often not as high-quality and may have faint printing or illegible portions.) I also have a hardcover copy in my office. If this is of interest, I can put this copy of the book on 2-Hour Reserve at the Library in the 2nd floor Learning Commons—please let me know. I have links to the online reader and PDF on Canvas.

Microbiology from OpenStax, Print ISBN 1938168143, Digital ISBN 1947172239.
See this website for details or to download: **https://openstax.org/details/books/microbiology**
On the left, choose "Download a PDF" or "Order a Print Copy" or "View Online," for example.

Preparation: To achieve success in this course it is necessary to read the material before class and review the material daily. (I know you are thinking there is no way you will read ahead of time, but because we will move through material quickly, it will become quickly overwhelming if you are not even vaguely familiar with the reading. It will also help you to come up with questions for concepts you don't understand, and have them ready to ask me in class.) I highly encourage you to go to a study group (set up by you or by the CAE—see below) weekly. Always ask questions if you do not understand!

Core Class Expectations:

Engagement with the Class: Attendance and active participation in both lecture and laboratory is expected. If you miss one lecture, you miss a lot of instruction, so missing class is a huge detriment to your understanding. Although I usually do not take attendance during the lecture (*exception:* the first two weeks of class I will call the roster and verify attendance), you are responsible for all information and material presented during the class. Assignments are expected to be turned in on-time or receive 10% penalty per day late; exceptions may be granted for accommodations requested ahead of due dates and for validly excused absences or circumstances. If you need to miss class for a planned activity, let your instructor know ahead of time. See the Attendance and Class Requirements policy in the undergraduate catalog.

In the event that a student needs accommodation for a religious or cultural holiday/observance, that student is encouraged to make that request as early in the semester as possible.

Temporary Academic Supports for Extended Absences with Letter: If you are dealing with an unexpected, extenuating circumstance that will keep you out of class or affect your performance for more than a day or two, reach out to Lisa Enright, Assistant Dean of Student Success, at lisa.enright@unh.edu to request a letter be sent to all your faculty.

If you are required to miss significant class time, you will be provided temporary academic supports so that you can continue to make satisfactory progress in this course. Please contact your course instructor to discuss the specific types of supports that will be implemented during your absence. Possible options you may be provided in this class include class notes from a peer and access to lecture slides/handouts and recorded lectures or the option of synchronous online sessions (although these will only be provided with advanced planning, because lectures taking place in person are not standardly streamed or recorded and this will only be done for official accommodations through the process above).

MyCourses and Email: Check MyCourses (Canvas) every day. Non-urgent announcements will be posted on MyCourses. Urgent/time sensitive announcements will be sent, where possible, via email. Check your UNH email account (the account registered in MyCourses) often. I am not allowed to contact you on a non-UNH email per federal regulations (FERPA).

Classroom Behavior Expectations and Classroom Recording: To ensure a climate of learning for all, disruptive or inappropriate behavior may result in exclusion (removal) from this class. As a reminder, cell phone/tablet, etc., use, including text messaging, and videotaping and recording is not permitted in this class unless by instructor permission. Students' enrollment in a UNH course is consent to being recorded by UNH media platforms for educational and remote access purposes. The University and Zoom have FERPA-compliant agreements in place to protect the security and privacy of UNH Zoom accounts. Students may **not** share recordings outside of this course. Please ask me before recording using portable recorders or the like. Cell phones should be put away during class except when research is asked for using your devices. Absolutely no online video-watching or gaming, etc., can happen during class. I will ask students to leave if they are not paying attention and/or are causing distractions.

Curtailed Operations: If the university curtails operations due to weather, we will not hold in-person activities for our safety and the safety of others. As soon as possible, I will post an announcement on Canvas about due dates, any make-up work, and (*if applicable*) any online options that may make sense depending on where we are in the course. Please make sure you have access to the UNH Alert RAVE system. If needed, sign up for RAVE Alerts here.

Academic Support/Tutoring: The Center for Academic Enrichment (CAE) professionals and peers are available to support all UNH Manchester students in maximizing their learning potential through individual in-person and online tutoring, in-class workshops, and study groups in math, writing, course content, study skills, time management, and personal statements. All

students registered for UNH Manchester courses are entitled to one hour of individual tutoring, per course, per week. Appointments are available at https://caetutor.unh.edu; for more information, contact the CAE at (603) 641-4113, or unhm.cae@unh.edu. **Fatoumatta Jallow is your assigned Primary Tutor for this course.**

Need Help with Accessibility? According to the Americans with Disabilities Act (as amended, 2008), each student with a disability has the right to request services from UNH to accommodate his/her/their disability. If you are a student with a documented disability or believe you may have a disability that requires accommodations, please contact Student Accessibility Services (SAS) located on the Manchester campus in the Student Services Suite (Office 405A). Accommodation letters are created by SAS with the student. Please follow-up with your instructor as soon as possible to ensure timely implementation of the identified accommodations in the letter. Faculty have an obligation to respond once they receive official notice of accommodations from SAS but are under no obligation to provide retroactive accommodations. For more information refer to www.unh.edu/sas or contact SAS at 603.862.2607, 711 (Relay NH) or sas.office@unh.edu.

Academic Honesty: The Biology and Biotechnology Programs at UNH Manchester will strictly adhere to the University policy on academic honesty, as published in the UNH Student Rights, Rules, and Responsibilities Handbook (https://catalog.unh.edu/srrr/). By turning in any piece of work in this course, you declare that you have read and understand the policy, and that you did not engage in any form of academic dishonesty as defined in the Handbook.

Plagiarism can take many forms, such as: submitting someone else's work - in whole or in part - as your own; collaborating on answers for individual assignments, or allowing your own work to be used by another student; copying information from a web site or other text without proper documentation; buying a pre-written paper or lab report. Computer-generated content may be helpful in preparing drafts, but should be used with caution. (See AI policy, below.). Your assignments submitted through Canvas will be routinely screened for plagiarism using sophisticated software. It is strongly recommended that you complete the Tutorial on Plagiarism in order to fully understand the definition(s) and all forms of it.

Cheating is mainly concerned with copying on exams or in lab, bringing crib notes into an exam or referring to notes or the textbook or any other source such as a programmable calculator, tablet, or cell phone during an exam. All electronic devises must be turned off and put away for the duration of the exam. Ear buds or similar devices are not permitted.

Any instances of cheating or plagiarism will result in consequences that can range from a failing grade on the assignment for all students involved to dismissal from the University, as defined in the UNH Student Rights, Rules, and Responsibilities Handbook.

Artificial Intelligence: AI/LLM (ChatGPT, Gemini, etc.) use is allowed for preliminary research or brainstorming within the Program. However, it is important to note that academic citation and source generation by AI tools is particularly problematic given evidence that these tools often invent citations even when they claim they are not doing so.

We highly value independent critical thinking and problem-solving skills and thus AI/LLM use is not allowed within the Program to generate answers or complete assignments. All use of AI/LLMs must be disclosed, including grammar polishing. In that case, the original unpolished version of the assignment must also be submitted along with the final version. Use of AI without disclosure is considered plagiarism and will be penalized and reported as such, with consequences as laid out above.

Emotional or Mental Health Distress: In partnership with The Mental Health Center of Greater Manchester, UNH Manchester offers consultation visits on a walk-in basis and through telehealth appointments.

Services include:

- Free confidential screening & consultation with a licensed mental health
- Referrals to mental health or substance misuse And assistance in understanding how to afford additional treatment (with or without insurance!) or find free services.

You may email: unhm.wellness@unh.edu to make an appointment to meet with a counselor by clicking here.

If you would like to connect to counseling services directly, you may do so by contacting The Greater Manchester Mental Health Center at (603) 668 - 4111.

The National Suicide Prevention Lifeline provides 24/7, free and confidential support via phone or chat for people in distress, resources for you or your loved ones, and best practices for professionals. **Call or text 988**. You can still use (800) 273-TALK (8255) too.

Confidentiality and Mandatory Reporting of Sexual Violence or Harassment:

The University of New Hampshire and its faculty are committed to assuring a safe and productive educational environment for all students and for the university as a whole. To this end, the university requires faculty members to report to the university's Title IX Coordinator (Bo Zaryckyj, Bo.Zaryckyj@unh.edu, 603-862-2930/1527 TTY**).** Faculty, staff or students on the Manchester campus can also contact Lisa Enright, Deputy Title IX Coordinator (lisa.enright@unh.edu; 603-641-4336; Room 439) to report any incidents of sexual violence and harassment shared by students.

If you wish to speak to a confidential support service provider who does not have this reporting responsibility because their discussions with clients are subject to legal privilege, you can contact the SHARPP Center for Interpersonal Violence Awareness, Prevention, and Advocacy at (603) 862-7233/TTY (800) 735-2964, as well as, Caroline Young, SHARRP Center Advocacy Expanded Services Coordinator for UNH Manchester (caroline.young1@unh.edu; room 417; Available in person Mondays 9 am to 4-pm and available by appointment (in person and virtually) by emailing caroline.young1@unh.edu).

Individuals can also access Reach Crisis Services NH 603-668-2299 (24 hours), 77 Sundial Ave., Suite 306W, Manchester, NH.

For more information about what happens when you report, how the university treats your information once a report is made to the Title IX Coordinator, your rights and reporting options at UNH (including anonymous reporting options) please visit student reporting options . The uSafeUS app is also available for students to keep reporting options and resources easily accessible on their phones.

Help us improve our campus and community climate. If you have observed or experienced an incident of bias, discrimination or harassment, please report the incident by contacting the Civil Rights & Equity Office at UNH.civilrights@unh.edu or TEL # (603) 862-2930 voice/ (603) 862-1527 TTY / 7-1-1 Relay NH, or visit the CREO website. Anonymous reports may be submitted.

Early Alerts: The University is invested in your academic success. If a faculty member is concerned about your academic behavior or performance, they may submit an academic alert -- particularly around Week 5. Academic alerts are not punitive. The goal is to provide you with support and resources to support your success. They act as an important check-in point and, if you receive an academic alert, you will receive an email to your UNH email address. It is strongly recommended that you meet with a professional advisor and connect with your instructor to discuss the reason for the alert.

Library: The UNH Manchester librarians are available to assist you with the research process. Visit the library's website at https://cps.unh.edu/library to learn about library services and to search for reliable academic sources. You can contact the library at 603-641-4173 or at unhm.library@unh.edu.
The links below guide you to useful online library resources:

- Make a Research Appointment with a librarian: https://libraryguides.unh.edu/remoteaccess/researchhelp
- Use the Library Search Box to find information: https://libraryguides.unh.edu/librarysearchbox_unhmanchester
- Reserve a Study Room: https://cps.unh.edu/library/support-services
- Discover resources for Citing Sources: https://libraryguides.unh.edu/unhmcitingsources
- Learn strategies for Evaluating Sources: https://libraryguides.unh.edu/ENGL401UNHManchester/evaluatingsources.

Food Pantry: UNH Manchester Food Pantry- located in room 437, is open Tuesdays and Thursdays. Students can sign up for individual appointment times to shop the pantry throughout the academic year.

BMS 503 Lecture Sequence SPRING 2025 (Subject to Change)

1/22	Introduction, Microbe of the Day, What Is Microbiology?	1
1/27	Types of Microbes, History of Microbiology, Koch's Postulates, Microscopy	3.1-3.2
1/29	More Microscopy, Intro to Staining of Cells, "Prokaryotes": Bacteria and Archaea ***Getting to know you assignment and students sign up for microbes of the day by Feb 2nd.***	2, 3.3
2/3	Prokaryotic and Eukaryotic Cell Structure and Function	3.3, 4
2/5	Eukaryotic Structure/Function, Viruses and Prions	2, 3.4, 6
2/10	Microbial Metabolism	7-8, App. A, C
2/12	Microbial Growth and Control	9, 13, App. B
2/17	Microbial Growth and Control (Last material for Exam 1)	
2/19	***EXAM 1***	
2/24	Microbial Ecosystems and Nutrient Cycling. **(NOTE: RECORDED LECTURE)**	8.7

2/26	Microbes in the Human World and Microbial Ecology, Microbial Interactions with Humans, Pathogenicity of Microbes **(NOTE: RECORDED LECTURE)**	4.1, 15
3/3	Microbial Interactions with Humans, Pathogenicity of Microbes	4.1, 15
3/5	Immunity I, Innate Immunity	17
3/10	Immunity II, Adaptive Immunity	18
3/12	Immunity III, Diseases of the Immune System	19
3/17-3/21	***UNH SPRING BREAK***	
3/24	Mechanisms of Pathogenicity, Virulence Factors, Toxins	15
3/26	***VACCINATION ACTIVITY IN CLASS*** (Last material for Exam 2)	18.5, 20
3/31	***EXAM 2***	
4/2	Diagnosis and Treatment of Infection	20, 14
4/7	Antimicrobials	14
4/9	Epidemiology and Public Health	16
4/14	***EPIDEMIOLOGY ACTIVITY IN CLASS***	16

4/16	Finish Epidemiology / Begin Microbial Genetics	10
4/21	Microbial Genetics	11
4/23	Microbial Genetics & Genomics and Advances ***NOTE: URC Poster Sessions, 4-6pm***	12
4/28	Finish Microbial Genetics & Genomics, Diversity of Life	10-12, 4-5, selections of 21-26
4/30	Diversity of Life: Pathogens	4.2-4.6, 5, App. D
5/5	Diversity of Life: Non-Pathogens. (Last material for Exam 3)	
5/7	***EXAM 3***	