BACTERIAL PATHOGENS MCB 5205

Fall 2022

Rationale for course

The overall goal of this class is to enhance student learning in the field of microbiology related to the various pathogenic mechanisms used by bacteria. This class will cover topics such as host-pathogen relationships, pathogenic mechanisms used by bacteria, antibiotic resistance, vaccines, and the microbiome's function in the disease. The students will participate in the discussion boards and case studies to apply their knowledge in real-life cases.

Instructor

Mariola Edelmann, Ph.D.

Contact information: medelmann@ufl.edu, Department of Microbiology and Cell Science, office location Microbiology, and Cell Science Bldg 981 Museum Rd., **Rm 1048**. The preferred method for communication with the instructor regarding the course is Canvas message or e-mail (medelmann@ufl.edu)

Instructor Office hours: Per appointment.

TA:

Technical issues: Please resolve technical issues by contacting the UF helpdesk (e.g. http://helpdesk.ufl.edu; (352) 392-HELP (4357); *helpdesk*@ufl.edu · HUB 132).

Delivery Method/Meeting time

The entire content of the course is available **online asynchronously.**

Optional LIVE ZOOM MEETING (live attendance is optional) is on **Tuesdays period 7 (1:55 p.m)**. **on weeks advertised**, and information about these will be posted in announcements. Questions can be e-mailed before the meeting. These class Q&A discussion/review sessions will be held in Canvas through 'conferences' to ask questions and interact with their instructors. All course content is delivered through the Canvas course website.

Credits – 3

Course Description

This course is concerned with host-microbe relationships in the diseases of humans and animals. The topics that will be covered include but are not limited to: the virulence characteristics of bacterial pathogens, the techniques used in their isolation or identification, molecular approaches to the study of their virulence, the details of host-pathogen relationships, antibiotic resistance, vaccines, and the function of the microbiome in the disease. Credits: 3; Prereq: MCB 3020 or MCB 3023 with a minimum grade of C.

Course Objectives/Goals/Learning Outcomes

Become knowledgeable on the complex nature of microbial virulence, especially concerning the complex interplay between the host immune system and pathogen

Provide examples of strategies and mechanisms used by bacterial pathogens causing disease, including but not limited to the attachment and entry into host tissues, evasion of host immune defenses, multiplication in vivo, dissemination, and transmission)

Gain the concepts and skills needed to understand and critically evaluate research articles and other material that addresses bacterial pathogenic mechanisms

Understand the methods and approaches that are used to access the virulence and infection mediated by bacterial pathogens

Become an expert in the analysis of case studies pertaining to infectious disease

Identify various strategies of both prevention and pharmacological (and other) treatment of host infection leading to infection and disease. Focus on vaccines, antibiotics, and microbiota.

Required Textbook:

Wilson et al. Principles of Bacterial Pathogenesis, A Molecular Approach (4th Edition), ISBN-10: 1555819400, ISBN-13: 978-1555819408

Additional Bibliography: Assigned Readings will be added for weekly homework and posted with assignments (available through Canvas or via UF libraries).

Overview of Course Format and Policies:

- This course is co-taught with MCB4203
- **An e-mail will be the primary mode of course correspondence**. Each student is responsible for checking their "**ufl.edu**" e-mail accounts and the Canvas course website daily for course messages and announcements.
- Course syllabus, lecture notes, and other tools are available through the Canvas Learning Support System homepage [http://lss.at.ufl.edu/]. You will need to enter your Gatorlink username and password to access the system. If you do not have an active GatorLink ID, cannot remember your GatorLink login information, or if your ID does not work, please refer to the GatorLink website [http://gatorlink.ufl.edu] or the UF Computing Help Desk (The Hub, 392-HELP) for assistance.
- **Course format:** All weekly course lectures, quizzes, assignments, and other materials will be posted no later than the beginning of each week (i.e., by Sunday evening) on the Canvas course website. A live-online review session -if available in a given week - will be held using the "zoom conferences" function in Canvas on some **Tuesdays during period 7 (1:55 p.m)**. Attendance to these live-online weekly reviews **is optional**. These sessions will be recorded and accessible through the "conferences" function in Canvas. Please see the Canvas course website for links to these meetings.
- **A note regarding course materials and copyright:** All course materials posted on the Canvas course website are assembled and intended for students taking MCB4203/MCB5205 ONLY, and only available for student use from our secure Canvas course website. Re-**posting any of these materials and sharing them via such resources as** studysoup, "course-hero", You Tube, quizlet, Facebook, etc**. is not permitted** by the course instructor. Please understand that u**nauthorized re-posting of course materials (including textbook PDFs) may infringe on UF's copyright policies and the "Fair Use" Act (http://www.generalcounsel.ufl.edu/faq/Copyright.pdf).**

Course Assessments and Grading:

- **Weekly quizzes (open book):** There will be 15 weekly online quizzes based on the weekly lecture material and/or posted readings. Each quiz is worth 4 points and will typically consist of multiple-choice questions. These open-book quizzes (administered through Canvas) are meant to help you review the course material and practice for the exams. Students are welcome to study together, and collaboration is encouraged. However, each student must submit his/her quiz by the posted due date. For review and study purposes, answers to quiz questions will be available in Canvas following each quiz due date.

• **CANVAS HINTS for ONLINE QUIZ AND ASSIGNMENT SUBMISSION** (provided by UF Computing Help Desk): You should take online assessments during Help Desk hours whenever possible. If you have a problem while taking an Assessment, log out and log back in as quickly as possible. If the assessment is timed, the timer will continue to run while you are logged out. ***If you still encounter difficulties, take a screen shot of the problem (Hit the "Print Scrn" button on your keyboard and paste "CTRL+V" into a program like Word or Paint) so the Help Desk can investigate and you will have "proof of technical difficulty" of the problem for your instructor.*** Call the Help Desk (352-392-4357) immediately. When you submit an Assignment/Assessment you get a confirmation screen that contains a confirmation number. The Assignment/Assessment list will also show this Assignment/Assessment as "submitted" including the date and time of your submission. If you do not get the confirmation screen and your Assignment/Assessment is not listed as "submitted," you have not submitted the Assignment.

• **Case-studies (open book):** There will be 3 online case studies; **each is worth 20 points** and will typically consist of several multiple-choice questions that are based on a case-study scenario with an associated set of problem-solving questions. These are made available ahead of time so you can answer all questions before starting the case-study quiz. Students are welcome to collaborate on these quizzes. However, each student is responsible for submitting his/her own quiz by the posted due date.

• **Graded discussion boards (open book):** There will be 2 graded discussion board activities assigned throughout the semester; these will be based on assigned videos or readings that supplement the weekly lecture material. **Each discussion board activity is worth 25 points.**

Final Written summary: Each student enrolled in MCB5205 will be responsible for choosing a historic, emerging, or re-emerging pathogen (bacterial) of interest, and will research available literature and prepare a written summary on the history of the pathogen, pathogenesis, description of host mechanisms that counteract this pathogen, treatment strategies and preventative strategies. Do include a paragraph on new exciting aspects of the study of this pathogen as well as any unanswered questions that could help with the design of treatments. The paper must be typed (double-spaced with 1-inch margins). The summary paper should include 7-10 pages. References, a title page, and figures/tables can be included on extra pages, and make sure to provide citations of these additional sources as well as detailed captions – also, refer to them in text. While the figures and tables are optional, they might be helpful in the presentation. The aim of this paper is to provide a summary or a review of peer-reviewed research articles published in scientific journals. Please contact me early in the semester to discuss the topic of your summary paper (including potential references you will use for the final paper) to confirm that your topic is relevant to the subject area, and we can also discuss the content during any of the scheduled meetings. Please upload the idea for a paper through Canvas e-learning by **the deadline stated (worth 5 points, see the assignment for details what is required)**, and the complete paper **through Canvas e-learning** by no later than the deadline stated in Canvas **(worth 95 points)**. This paper will be scanned by TurnItIn for plagiarism. Contact me if you have doubts about what constitutes plagiarism. ***Points for this assignment: 5 points for the idea and 95 points for the finished product.***

For written assignments, please use the following reference format or similar for the citations:
  Article in a periodical: Needham BD, Trent MS. Fortifying the barrier: the impact of lipid A remodeling on bacterial pathogenesis. Nat Rev Microbiol. 2013;11(7):467–81.
  Article in a book: King, S.M. (2003). Dynein motors: Structure, mechanochemistry and regulation. In Molecular Motors, M. Schliwa, ed. (Weinheim, Germany: Wiley-VCH Verlag GmbH), pp. 45–78.

  Endnote Web (provided free of charge by UF) and other library management software can be used to help with this aspect: http://web.uflib.ufl.edu/endnoteweb.html

- **Exams:**
  ➢ There will **be 3 practice exams** (see attached weekly course schedule). These exams are meant to prepare you for the final exams and are **NOT graded.**

  ➢ There will **be 3 exams** throughout the semester (see attached weekly course schedule), each worth 110 points see grading scheme below).

Honorlock will proctor your exams this semester. Honorlock is an online proctoring service that allows you to take your exam from the comfort of your home. You DO NOT need to create an account, download software or schedule an appointment in advance. Honorlock is available 24/7 and all that is needed is a computer, a working webcam, and a stable Internet connection. **To get started, you will need Google Chrome and to download the Honorlock Chrome Extension. You can download the extension at www.honorlock.com/extension/install.** When you are ready to test, log into the LMS, go to your course, and click on your exam. Clicking Launch Proctoring will begin the Honorlock authentication process, where you will take a picture of yourself, show your ID, and complete a scan of your room. Honorlock will be recording your exam session by webcam as well as recording your screen. Honorlock also has an integrity algorithm that can detect search-engine use, so please do not attempt to search for answers, even if it is on a secondary device. Good luck! **Honorlock support is available 24/7/365. If you encounter any issues, you may contact us by live chat, phone (844-243-2500), and/or e-mail (support@honorlock.com). If you encounter issues within the LMS, you may contact Your School's Online Support Services team at their number.**

Prior to the start of each exam, you will need the following:

● Government-issued photo ID (or Student photo ID).

● Working camera and microphone.

● Stable internet connection.

● Google Chrome browser (https://chrome.com).

During the test: The online testing environment should mimic the 'in class' testing environment, and has the following guidelines:

Testing Area:

● Sit at a clean desk or table (not on a bed or couch)

● Lighting in the room must be bright enough to be considered "daylight" quality. Overhead lighting is preferred; however, if overhead is not possible, the source of light should not be behind the student

● Ensure your desk or table is cleared of all other materials.

● If prompted to do a room scan, be sure to include your work area. Make sure to do a complete 360° rotation of your room, then show your workspace. Partial scans and/or failure to show your workspace may be flagged during the proctoring review.

● Make sure your laptop is fully charged or keep the charger within arm's reach.

The following items/actions are not permitted:

● No writing visible on desk or on walls.

● No websites other than Canvas and the Honorlock proctoring extension should be used or open while taking a proctored exam.

● Close all other programs and/or windows on the testing computer prior to logging into the proctored test environment.

● Make sure music/televisions are not playing in the background.

● Communication or receiving assistance from others is not permitted during a proctored assessment. Exceptions: contacting Honorlock support or your institution's help desk.

● No other persons except the test-taker should be in the room during testing.

● Using a phone or any other electronic device, other than your test-taking device, is not permitted.

● Remain visible in the web camera during the entire duration of the exam.

● Leaving the room during the testing period is not permitted.

● You must not take the computer into another room to finish testing (exam must be completed in the same room the "Exam Environment View" is completed in).

● Headphones or smart watches are not permitted.

● Dual monitors are not permitted.

Honorlock support: 1-(844) 243-2500

➢ Each exam is designed to be completed in 75 minutes or less. However, **the time-limit on each exam will be set at <u>100 minutes as a buffer in case of any unexpected technical difficulties with Honorlock</u>.**

➢ If you are unable to take an exam because of a technical glitch on your end (computer broken, poor internet connectivity), that is your responsibility and does not constitute an excused absence for an exam.

➢ *For additional questions, please review the Honorlock Student Handout (available under Modules on Canvas course website).*

➢ The dates and window for completing each exam is specified in the weekly course schedule (last page of syllabus).

➢ **Make sure you sign-up for the correct exam course number - MCB4203 + your section number (3372 for on-campus students and 002H for UF Online students).**

➢ The rules and format for each Exam will be reviewed prior to each exam period. Materials such as cell phones, scratch paper, books, notes, calculators, etc. <u>are NEVER allowed during the exam</u>.

Exam videos will be reviewed by the course instructor and TA to verify that academic integrity of your exam has not been breached.

Grading Policy
The grading scheme for this course is as follows:

Weekly quizzes: 15 @ 4 points each (60 points total)

Graded discussion boards: 2 @ 25 points each (50 points total)

Open-book case studies: 3 @ 20 points each (60 points total)

Final Written Essay: (5 points for the idea/ 95 points for the finished product) 100 points

EXAM 1 (Honorlock, Weeks 1-5 material): 110 points

EXAM 2 (Honorlock, Weeks 6-9 material): 110 points

EXAM 3 (Honorlock, Weeks 10-14 material): 110 points

TOTAL POINTS = 600

Final letter grades will be assigned based on the number of points earned, as follows:

A = 552-600 points	C+ = 462-479.9 points	E = 0-359.9 points
A- = 534 – 551.9 points	C = 438-461.9 points	
B+ = 522 – 533.9 points	C- = 420-437.9 points	
B = 504 – 521.9 points	D+ = 390-419.9 points	
B- = 480-503.9 points	D = 360-389.9 points	

For information on current UF policies for assigning grade points, see
https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/.

Weekly Course Schedule

SCHEDULE OF WEEKLY LECTURE TOPICS (final version may change slightly):

Date (first day of a week)	WK	TOPICS	TEXTBOOK CHAPTERS
8/24	1	Introduction to Course, Hot topics, One	Wilson Ch. 1
8/29	2	Physical Defenses, Innate Immunity	Wilson Ch. 2-3
9/5	3	Adaptive Immunity, Vaccination	Wilson Ch. 4, Wilson Ch.17
9/12	4	Microbiota	Wilson Ch. 5 **Case study #1**
9/19	5	Koch's postulates, human-microbe interactions; Barry Marshall guest lecture	Wilson Ch. 6 **Practice exam#1**
9/19	5	**EXAM 1 WINDOW: SEPT. 19 @ 6 AM EST – SEPT. 25 @ 11:59 PM EST, 2022**	**Covers weeks 1-5 material**
9/26	6	Measuring Infectivity and Virulence	Wilson Ch. 8 **The topic for the written summary due October 2nd**
10/3	7	Identification of Bacterial Virulence Factors	Wilson Ch. 9-10 Assigned documentary (**Discussion board #1**) https://www.pbs.org/wgbh/nova/video/vaccines calling-the-shots/
10/10	8	Bacterial Evasion of Host Defenses, *Salmonella*	Wilson Ch. 11 **Case study #2**
10/17	9	Bacterial Toxins	Wilson Ch. 12 **Practice exam#2**
10/17	9	**EXAM 2 WINDOW: October 17 @ 6 AM EST – October 24 @ 11:59 PM EST, 2022**	**Covers weeks 6-9 material, excludes discussion board activity**
10/24	10	Delivery of Virulence Factors, Virulence regulation	Wilson Ch. 13-14
10/31	11	*Yersinia pestis;* Antimicrobial therapeutics	Wilson Ch. 15-16 Assigned documentary (**Discussion board #2**): https://www.pbs.org/wgbh/frontline/film/hunting -the-nightmare-bacteria/
11/7	12	Antibiotic Resistance	Wilson Ch. 15-16
11/14	13	Gram-positive opportunistic pathogens; MRSA	Wilson Ch. 18 **Case study #3**
11/21	14	Gram-negative opportunistic pathogens, ESKAPE Bioterrorism	Wilson 19- 20 **Practice exam #3**
11/28	15	**EXAM 3 WINDOW: Nov 28@6AM EST – DEC. 4 @ 11:59 PM EST, 2022**	**Covers weeks 10-15 material (excludes discussion board activity)**
12/5	16		**Written summary due Dec 5 2022** **Extra credit due**

Class Attendance and Make-Up Policy

Class attendance and make-up policies are according to the university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx). Excused absences follow the criteria of the UF Undergraduate Catalog and should be communicated to the instructor prior to the missed exam whenever possible.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance:

Health and Wellness

University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/
- o Counseling Services
- o Groups and Workshops
- o Outreach and Consultation
- o Self-Help Library
- o Wellness Coaching

U Matter We Care, www.umatter.ufl.edu/
Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/

Emergencies

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.aa.ufl.edu/students/. Students will be notified when the evaluation period opens and can complete evaluations through the e-mail 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.aa.ufl.edu/public-results/

Class demeanor

Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Please avoid the use of cell phones and restrict eating to outside of the

classroom. 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.

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.

http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf

Plagiarism/Academic Honesty

Please note that plagiarism is against the UF honor code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/

"(a) **Plagiarism**. A student shall not represent as the student's own work all or any portion of the work of another. Plagiarism includes but is not limited to:

1. Quoting oral or written materials including but not limited to those found on the internet, whether published or unpublished, without proper attribution."

You must use your own words to communicate oral and written materials presented in the oral reports, scientific evaluations, and summaries of this course.

Online modules are available to assist you with making ethical decisions regarding plagiarism and other codes of conduct at https://www.dso.ufl.edu/sccr/seminars-modules/ .

As part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action.

It is assumed that you will complete all work independently unless the instructor provides explicit permission for you to collaborate on specific course tasks. UF academic honesty policies will be vigorously upheld at all times in this course.

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).

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation 0001 Reid Hall, 352-392-8565, https://disability.ufl.edu/

University of Florida U Matter

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available, including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 911.

University of Florida Complaints Policy and Student Complaint Process

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

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://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

> Online Course: http://www.distance.ufl.edu/student-complaint-process.