

MICB 408: ADVANCED BACTERIAL PATHOGENESIS

Course Syllabus 2023W2

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A. INSTRUCTORS

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B. COURSE DESCRIPTION AND LEARNING OBJECTIVES

Bacterial pathogenesis is the process by which bacterial infect host cells and cause disease. Some bacteria use a variety of virulence factors (either present on the surface of microbes, secreted into the environment, or injected into the host cytoplasm) that contribute to their ability to become pathogenic. Recent discoveries in the field of Microbiology and Immunology have revolutionized our understanding of how bacteria cause disease and have provided new avenues for the development of antimicrobial drugs. This course will cover 6 major topics and provide the students with theoretical and practical knowledge to understand, analyze and critically evaluate original research on these topics.

General course learning objectives

1. Students will develop advanced knowledge of recent breakthroughs in microbiology, including structural microbiology and taxonomy, that will prepare them for diverse careers in industry and academia.
2. Students will be able to critically evaluate original research articles and apply learned concepts from class.
3. Students will fit new approaches and original research into a growing framework of understanding major topics in bacterial pathogenesis.
4. Students will analyze figures, write figure legends, organize figures into a story and write an abstract for a paper based on the figures.

C. COURSE STRUCTURE AND CONTENT

3-credit course

Lectures: **MWF 10-11AM.**

Location: **BIOL 1012**

Prerequisite: MICB 308

Students are responsible for regularly monitoring the Canvas website for homework, due dates and announcements. The Canvas Calendar and Assignments list provide an effective way for students to keep track of course activities and due dates. All course materials will be available on Canvas. Recorded lectures will not be provided even if a student misses a class.

The course is divided into **6 Modules (Two-week cycle per module)**.

Modules include:

1. **Microbial ultrastructure and major virulence factors (Tocheva)**
2. **Cell envelope and dormancy (Tocheva)**
3. **Secretion systems and host-pathogen interactions (Tocheva)**
4. **Sessile lifestyles (ie. biofilms) (Sun)**
5. **Antimicrobial resistance (Winter)**
6. **Motile lifestyles (Sun)**

Each module cycle includes:

- Week 1: lectures, analysis of a peer-reviewed article
- Week 2: Figure legend and abstract writing assignments, quiz on Friday

Lectures. Each module will have 2 lectures that introduce a topic and cover the basic theory. Lecture 3 will provide an example on the topic that will be covered by the instructor. **Lecture slides, relevant material, and papers** will be provided via Canvas for reading and downloading. There is no textbook for this course but you can refer to Bacterial Pathogenesis: a molecular approach, 4th edition if you have it from MICB 308. Some optional readings maybe provided to give background and further details on some topics in the lectures. *For the quizzes, students are responsible for all material provided via Canvas.* Students are expected to study a subset of the lectures, papers, and slides in a course section prior to quizzes and class discussions of the corresponding material.

D. COURSE SCHEDULE

Week	Class #	Instructor	Date	Content	Module #
1	1	Elitza	Mon Jan 8	Microbial ultrastructure	Module 1
	2	Elitza	Wed Jan 10		
	3	Elitza	Fri Jan 12		
2	4	Elitza	Mon Jan 15		
	5	Elitza	Wed Jan 17		
	6	Elitza	Fri Jan 19		
3	7	Elitza	Mon Jan 22	Cell envelope and Dormancy	Module 2
	8	Elitza	Wed Jan 24		
	9	Elitza	Fri Jan 26		
4	10	Elitza	Mon Jan 29		
	11	Elitza	Wed Jan 31		
	12	Elitza	Fri Feb 2		
5	13	Elitza	Mon Feb 5	Secretion Systems	Module 3
	14	Elitza	Wed Feb 7		
	15	Elitza	Fri Feb 9		
6	16	Elitza	Mon Feb 12		
	17	Elitza	Wed Feb 14		
	18	Elitza	Fri Feb 16		
7			Feb 19-23	Reading week	

8	19	Evelyn	Mon Feb 26	Sessile Lifestyles (ie. biofilms)	Module 4
	20	Evelyn	Wed Feb 28		
	21	Evelyn	Fri Mar 1		
9	22	Evelyn	Mon Mar 4		
	23	Evelyn	Wed Mar 6		
	24	Evelyn	Fri Mar 8		
10	25	Kaitlin	Mon Mar 11	Antimicrobial Resistance	Module 5
	26	Kaitlin	Wed Mar 13		
	27	Kaitlin	Fri Mar 15		
11	28	Evelyn	Mon Mar 18		
	29	Evelyn	Wed Mar 20		
	30	Evelyn	Fri Mar 22		
12	31	Evelyn	Mon Mar 25	Motile Lifestyles	Module 6
	32	Evelyn	Wed Mar 27		
			Fri Mar 29		
13			Mon Apr 1	No lecture, Easter Monday	
	33	Evelyn	Wed Apr 3	Motile Lifestyles	
	34	Evelyn	Fri Apr 5		
14	35	Evelyn	Mon Apr 8		
	36	Evelyn	Wed Apr 10	Quiz 6	
			<i>Exam period</i>	<i>No final exam</i>	

E. GRADING SCHEME

The following is a summary of the grade distribution for MICB 408:

	% Final grade	Content	Time
Quizzes (6)	60 (10% each)	Based on lecture material and 1 assigned paper	Every second Friday
Figure legends	6% (1% per module)	Teams write a figure legend and post them on Canvas for participation	Every second Monday
Abstracts	24% (4% each)	Teams write an abstract based on the figures presented every second Monday of each module. Hand-in on Canvas.	Every second Wednesday
Annotated bibliography	10%	Write an annotated bibliography on any assigned paper from any module	End of term Due Apr 14

Figure legends activity. Every second week of each module, students will be assigned to a team to write a figure legend for an assigned data figure or table. The data figure or table will be provided on the second Monday of each module. One person on the team will be responsible for posting the figure legend that they have written on the Discussion board on Canvas. This component makes up 1% of participation per module which includes being present during this lecture and contributing to the synthesis of the figure legend.

Abstracts activity. Following the figure legends activity, working with the same team, students will be asked to sort the figures and/or tables from the figure legends activity to collectively write an abstract based on the data provided. Rubrics and guidelines for the abstracts will be provided on Canvas. Each abstract is worth 4%. One submission of an abstract per group.

Annotated bibliography. Each student can select a module of interest and write an annotated bibliography which involves summarizing and evaluating the paper used for the second week activities (ie. the figure legends and abstract) to be submitted at the end of the term. Rubrics and guidelines for the annotated bibliography will be provided on Canvas.

Quizzes. There is **no final exam** for this course. Instead, there will be one quiz for each module of the course for a **total of 6 quizzes**. These quizzes will help students assess their understanding of the corresponding course material. Students can and should consult course materials while answering questions. Students will receive a grade for each quiz which will contribute to the final grade in the course. Quizzes will be held on Canvas, are expected to last about 50 minutes, are open book, and will be due at the end of the class. However, due to the time limit, students will need to know the course material well to succeed on the quiz. During the quiz, students are forbidden from consulting non-course material, searching the internet, or communicating in any way with anyone other than the instructor (see Academic integrity below). Quizzes will be graded via Canvas, and students will receive their scores as soon as the grading is complete.

F. POLICY FOR MISSED ASSESSMENTS (quizzes, in-class participation)

If you are unable to write a quiz or participate during an in-class activity for medical reasons or other excusable circumstances (e.g., family emergency), a make-up quiz will be scheduled or alternative deadlines will be provided. The make-up quiz must be written within 72 hours of the original quiz. If you are unable to write the make-up quiz in the allotted time period, the weighting of the missed quiz may be re-distributed evenly to the other quizzes but this is under special circumstances at the instructor's discretion.

G. CENTRE FOR ACCESSIBILITY

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available here (<https://senate.ubc.ca/policies-resources-support-student-success>).

Students who are registered with UBC's Centre for Accessibility should contact the Centre as soon as possible to discuss how your accommodations can be met.

H. ACADEMIC MISCONDUCT

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at <http://calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,0>