

## Syllabus MB430/530 Bacterial Pathogenesis Spring 2018

3 credit hours

CRN 54609; Rogers Hall 230; MWF 1000-1050.

**Prerequisites: MB 302, MB 310, and (BB 451 or BB 491)**

Instructor: Dr. Martin Schuster; Office Nash 422; email: martin.schuster@oregonstate.edu

Office hours: Thu 2-3 pm or by appointment

Text: Todar's Online Textbook of Bacteriology (textbookofbacteriology.net)

### Course content

Month	Day	Lec.	Topic	Textbook chapter
Apr	02 M	1	Introduction	Overview of bacteriology
	04 W	2	Studying bacterial infection I	Structure and function of prokaryotes
	06 F	3	Studying bacterial infection II	The nature of host-parasite interactions
	09 M	4	Innate immunity	Not covered as a separate chapter
	11 W	5	Adaptive immunity and vaccination	Immune defense/innate immunity
	13 F	6	Bacterial survival and evasion I	Immune defense/adaptive immunity
				Nutrition and growth of bacteria
				Bacterial structure in relation to pathogenicity <sup>1</sup>
				Colonization and invasion by pathogens <sup>1</sup>
	16 M	7	Bacterial survival and evasion II	Bacterial defense against phagocytosis <sup>1</sup>
				Bacterial defense against immune responses <sup>1</sup>
	18 W	8	Bacterial toxins and protein secretion	Bacterial protein toxins
	20 F	9	Antimicrobials and antibiotic resistance	Antimicrobial agents
				Resistance to antimicrobial agents
	23 M		<b>Midterm I</b> (100 points; covers lectures 1-9)	
	25 W	10	The spirochetes	Bacterial pathogens of humans
				<i>Borrelia burgdorferi</i> and lyme disease
	27 F	11	<i>Yersinia pestis</i> ; plague	Not covered as an individual chapter
	30 M	12	Staphylococci	<i>Staphylococcus</i> and staphylococcal disease
	02 W	13	Streptococci	<i>Streptococcus</i> and streptococcal disease
	04 F	14	<i>Bordetella pertussis</i>	Whooping cough ( <i>Bordetella pertussis</i> )
May	07 M	15	<i>Pseudomonas aeruginosa</i>	Opportunistic infections by <i>P. aeruginosa</i>
	09 W	16	<i>Legionella</i> and <i>Listeria monocytogenes</i>	Not covered as an individual chapter
	11 F	17	Tuberculosis: Self-study	Tuberculosis ( <i>Mycobacterium tuberculosis</i> )
	14 M	18	Tuberculosis: In-class discussion; review	
	16 W		<b>Midterm II</b> (100 points; covers lectures 10-18)	
	18 F	19	<i>Chlamydia</i>	Not covered as individual chapter
			<b>last day to withdraw or change to S/U</b>	
	21 M	20	<i>Neisseria</i>	<i>Neisseria</i> : Gonorrhea and meningitis
	23 W	21	<i>Bacillus anthracis</i> and bioterrorism	<i>Bacillus anthracis</i> and anthrax
	25 F	22	<i>Vibrio cholerae</i>	Cholera ( <i>Vibrio cholerae</i> )
	28 M		<b>Memorial Day</b>	
	30 W	23	<i>Salmonella</i>	<i>Salmonella</i> and Salmonellosis
Jun	01 F	24	<i>Escherichia coli</i>	<i>E. coli</i> : Gastroenteritis, urinary tract infections
	04 M	25	Normal microbiota	The bacterial flora of humans
	06 W	26	Paper presentations	Assigned papers
	08 F	27	Paper presentation; recap and outlook	Assigned papers
	14 R		<b>Final Exam</b> (100 points; <u>2:00 pm</u> , 110 min, ROG 230; covers lectures 19-27)	

<sup>1</sup> These four chapters are largely identical to the single chapter "Mechanisms of bacterial pathogenicity"

### Course policies

Lecture handouts will be posted as the course proceeds. These will correspond to most, but not always all, slides used during lectures; spoken lecture material will frequently present more explanations and detail than is shown in handouts. Exam material will draw upon lecture content: there will be two midterms and a final exam. Exams are in class, closed-book, and are comprised of multiple-choice and short-answer questions. Practice tests will be made available before each exam as an example of the test style and level of difficulty. Assigned reading complements the material covered in class. It can help you better understand lecture material and can help you do better on the exams. I recommend reading the assigned book chapters after class to review and reinforce what was covered. I welcome questions during and outside class time. Office hours are Thursday 2-3 pm; additional appointments can be arranged by telephone, e-mail or during class. *Canvas* will be used for posting course material such as announcements, handouts, additional reading, practice tests, exam results and answer keys. Note the prerequisites and contact me if you lack standard prerequisites but have other experience that makes you confident you are prepared to take the course. Cell phones must be turned off during class, and food consumption is not permitted.

### Exams and Grading

MB430/530: The final grade will be based on the cumulative scores of three exams (Midterm I, 100 points; Midterm II, 100 points; Final Exam, 100 points), and of one written take-home group assignment during weeks 7-9 of class (100 points). There will be 10 points of extra credit for attending the MSA Symposium on April 8. The final grade will be assigned on a curve. There will be no make-up exams (except for a doctor's note). There will be one make-up opportunity for the 10 points of extra credit. MB530 only: Presentation of a scientific paper and participation in the discussion of these presentations will be worth additional 100 points.

### Learner Outcomes

At the completion of the course, you should:

1. Have acquired specialized language relevant to pathogenic microbiology;
2. Be able to describe the basic design, infection and replication strategy of bacteria, and the diseases they cause;
3. Be able to communicate and explain in writing key aspects of pathogenic microbiology;
4. Recognize and evaluate currently exciting topics and issues in the field of pathogenic microbiology;
5. Read and understand original scientific literature in bacterial pathogenesis.

In addition, students enrolled in MB530 should be able to critically evaluate, present and explain original scientific literature in the area of bacterial pathogenesis.

### Learner Expectations (advice for doing well in this course)

Intelligently and politely utilize the learning opportunities provided by lectures:

1. Attend all classes; do not arrive late or leave early
2. Lecture notes/handouts are available in *Canvas* about 15 h prior to each lecture. It is your responsibility to print them out and bring them to class. You may write notes on them during the lecture. Content may deviate slightly from actual content covered in class
3. Make notes on anything that is unclear or that you are curious about and seek an answer from me, a classmate or the text
4. Keep up in your understanding and assigned reading; if you fall behind you will not be able to follow lecture material and will rapidly fall still further behind. Do not hesitate to consult me to help you keep up and catch up.
5. You should allocate at least 2 hours of study for each hour lecture throughout the course; don't be tempted to rely on cramming.

**Information on take-home group assignment**

This is a mandatory assignment worth 100 points (out of 400 total points for undergraduate students, and 500 total points for graduate students). You will work in groups of 3-4 students. It is your responsibility to find partners or to let me know that you would like to be assigned to a group. The format is essay style (whole sentences), max. 3 typed double-spaced pages, 1 inch margins, 11 font Arial or 12-font Times New Roman. This is an open book exam, so you may use your class notes, textbook, library or internet resources. However, you may not seek help from individuals outside your group. The university honor code applies. The assignment will be handed out in class on Monday, May 14, and is due as one printed copy per group on Monday, June 4 at 10 am, at the beginning of class. Please write the names of all group members on top of the first page, and sign with your names.

**Information on extra credit for attending the MSA research Symposium**

There will be 10 points of extra credit for attending at least one Bacterial Pathogenesis talk at the MSA symposium held on Saturday, April 7 from 9 am to 5 pm in 112 Kearney Hall. Researchers from around the Northwest will be presenting their work in various areas of Microbiology, including Bacterial Pathogenesis. You will be required to have your name and OSU ID recorded by an MSA officer as proof of attendance. You will also be required to write a short, single-page summary of 200 to 300 words of an individual talk in the area of Bacterial Pathogenesis (i.e. by Drs. Fikadu Tafesse, Aleksandra Sikora, Lia Danelishvili). If you attended more than one of these talks, choose one. In writing your summary, follow these guidelines:

1. Write 1-2 introduction sentences that explain topic, purpose, and research question(s).
2. Write 1-2 sentences describing the main research methods or techniques used (this may also include the type of data analysis used).
3. Write 1-2 sentences describing the results / findings.
4. Write 1-2 sentences containing the major conclusions and implications of the work.

I suggest that you take notes during the talk and write your summary based on these notes, while the talk is still fresh in your mind. The header should include your name, the name of the presenter, and the title of the talk. Those that are unable to attend the symposium for valid reasons (academic, athletic, work etc) will have a makeup opportunity. They may attend the Spring 2018 Microbiology Undergraduate Symposium in May (exact date to be announced), and write a summary of one of the talks as described above.

**University, College and Departmental Policies:**

For students with documented disabilities: "Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098."

**Please note: The Department of Microbiology follows the university rules on civility and honesty.**

These can be found at <http://oregonstate.edu/studentconduct/regulations/index.php#acdis>  
At Oregon State University academic dishonesty is defined by the Oregon Administrative Rules 576-015-0020.1.a-c as: a) "Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another."

(i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

(ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

(iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

(iv) TAMPERING - altering or interfering with evaluation instruments or documents.

(v) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

“Academic dishonesty cases are handled initially by the academic units (collection of evidence and documentation of incident, meeting with student regarding the situation, determination of responsibility and academic penalty) but will also be referred to the Student Conduct Coordinator for action under the rules.”

Behaviors disruptive to the learning environment will not be tolerated and will be referred to the Office of Student Conduct for disciplinary action.

“The goal of Oregon State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning will not be tolerated, and will be referred to the Student Conduct Program for disciplinary action. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.”