



MICR*4010 Pathogenic Bacteriology

Winter 2018

Sections(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - December 15, 2017

1 Course Details

1.1 Calendar Description

This course focuses on the interactions between bacterial pathogens and host animals, including immune and inflammatory responses of the host's defense mechanisms. The structural and physiological characteristics of a number of important bacteria causing human and animal diseases are considered.

Pre-Requisite(s): MBG*3080, MCB*2050, MICR*3230

1.2 Course Description

- The aim of this course is to examine the fundamental aspects of bacterial structure, physiology, genetics and how these factors interact with host systems during infections.
- Through course assignments, each student will be required to obtain and synthesize information about several specific pathogens, and will be expected to contribute knowledge about these pathogens to regular class discussions.
- In order to stimulate awareness of how bacterial pathogens shape the world around us, students will also be expected to keep abreast of current affairs during the course period as they relate to bacterial pathogens.

1.3 Timetable

Classes will be held in MCKN234, on Fridays from 2.30-5.20pm

1.4 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

2 Instructional Support

2.1 Instructional Support Team

Course Co-ordinator: Emma Allen-Vercoe
Email: eav@uoguelph.ca

Telephone: +1-519-824-4120 x53366
Office: SC1 3252
Office Hours: There are no regularly scheduled office hours. Contact course coordinator to make an appointment if required.

3 Learning Resources

There is no required textbook for this course – as a senior level course, the primary and secondary literature is your textbook. The course coordinator will give advice and guidance on selected readings, and you will be expected to augment this with your own literature research.

4 Learning Outcomes

By the end of this course, students will be expected to understand the fundamental components of host-bacterial pathogen interactions, and to apply these concepts to the study of *any* bacterial pathogen with a goal of understanding the likely outcome of infection. Students will also be expected to be proficient in the reading *and understanding* of the primary literature as it pertains to bacterial pathogenesis, with the added ability to critically evaluate experiments and to suggest pertinent future directions for research.

4.1 Learning Objectives

This is an advanced course. Emphasis will be placed on demonstrating the ability to ‘think, discuss, integrate and synthesize’. Students are expected to take responsibility for their own learning, and lectures should be seen as introductory to a given topic. More in depth reading suggestions, from pertinent and recent scientific papers, will be provided during class time, and for full understanding it is expected that students augment their class-time learning with home study.

On the first day of class, each student will draw from a hat the names of three pathogenic bacterial species, “pet pathogens,” which will form the basis of their take home assignments. During class students will be especially expected to contribute information about their pet pathogens to class discussions. The primary aims of the course are as follows: a) To develop an understanding of the molecular bases for bacterial pathogen-host interactions and some of the approaches and tools used to investigate them. b) To develop critical thought – the ability to take information from the literature, evaluate it, and to draw your own conclusions from it. c) To develop an awareness of the impact of bacterial pathogens on the world around us, and an appreciation for the importance of microbiology as a scientific discipline.

5 Teaching and Learning Activities

Each lecture will demonstrate a theme in bacterial pathogen interactions. In general, only human disease will be discussed, although some bacterial infections of agricultural and veterinary importance will also be explored as appropriate. A class schedule is given below. The schedule may be subject to slight change according to the needs of the class and availability of ‘just published’ hot topics in bacterial pathogenesis.

5.1 Lectures

Date	Topic	Assignments/notes
Friday January 12th	First Day Of Class bits & pieces The normal bacterial microbiota of humans -not all bugs are bad!! Defining virulence/pathogenicity - what makes some bacteria pathogenic?	Hand out: assignment 1 "Bacterial Pathogens Top Trumps!" Pick pet pathogens
Friday January 19th	Virulence factor: Adhesins -Mechanisms -Tissue tropism -Consequences -Prevention	
Friday January 26th	Virulence factor: Invasins -Mechanisms -Consequences -Bacterial survival and growth after invasion	
Friday February 2nd	Aggressins -The world of bacterial toxins	
Friday February 9th	Virulence factor: Impedins -Immune defenses of the mucosa -The innate and adaptive immune responses to bacterial pathogens	

	<p>(brief review/refreshers*)</p> <ul style="list-style-type: none"> -Bacterial evasion of host immune responses -Bacterial control of cell cycle and apoptosis -Mechanisms of microbiota control of pathogens 	
Friday February 16 th	<p>Midterm exam – first hour of class</p> <p>Virulence factor: Modulins</p> <ul style="list-style-type: none"> -Cytokines and cytokine networks -Bacterial interaction with the cytokine network 	<p>Due date: assignment 1</p> <p>Hand out: assignment 2</p> <p>“Build-a-Pathogen Workshop”</p>
Friday February 23 rd	<p>WINTER BREAK</p> <p>–NO CLASSES</p>	
Friday March 2 nd	<p>Guest lectures: Drs. Georgina Cox and Rebecca Shapiro</p> <p>(Dr. A-V will be away this week)</p>	
Friday March 9 th	<p>In depth: 3 bacterial pathogens that have shaped our history</p> <p>(Can you guess what they are?)</p>	40 th class day – last day to drop classes
Friday March 16 th	<p>Bacterial pathogenomics: using bacterial genomes to understand and predict virulence</p> <p>Polymicrobial infections</p> <p>Idiopathic diseases where microbes might be to blame</p>	
Friday March 23 rd	<p>Antibiotics – “Miracle drugs” or “hazardous substances”?</p>	

	Probiotics, prebiotics, synbiotics & ecobiotics Alternative antimicrobial strategies in medicine	
Friday March 30 th	GOOD FRIDAY HOLIDAY (NO CLASSES SCHEDULED)	
Friday April 6 th	Bacteria as biological weapons - Why all the hype? - In depth: 3 microbial pathogens that could be used as biological weapons	Due date: assignment 2
TBA	FINAL EXAM	Room TBA

6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Midterm	20.00
Assignment 1	20.00
Assignment 2	20.00
IFAT Card	10.00
Final Exam	30.00
Total	100.00

6.2 Assessment Details

Midterm (20.00%)

Please ensure you are present for the midterm exam, as there will be no opportunity available to sit the exams at an alternative time.

Assignment 1 (20.00%)

Please ensure that your hardcopy work (where appropriate, for assignment 1) is handed in to the course coordinator during class time, or under the office door of SCIE 3252 by 5pm on the due date. Remaining work can be submitted electronically through the Dropbox facility in the

Courselink site for this course.

Assignment 2 (20.00%)

Please ensure that your hardcopy work (where appropriate, for assignment 1) is handed in to the course coordinator during class time, or under the office door of SCIE 3252 by 5pm on the due date. Remaining work can be submitted electronically through the Dropbox facility in the Courselink site for this course.

IFAT Card (10.00%)

- In-class participation and understanding will be assessed each week using Immediate Feedback Assessment Technique (IFAT) cards. This assessment will be worth 10% of your final grade.
- The time, date and location of the final exam are TBA. The final exam will be worth 30% of the final grade.

Final Exam (30.00%)

Date: TBATBA

7 Course Statements

7.1 When You Cannot Meet a Course Requirement

- Please advise Dr. A-V promptly by e-mail if you encounter difficulties meeting any of the above deadlines and have just cause for accommodation to be made.
 - The assignment will be accepted for grading up to 5 calendar days after the deadline, with a 20% paper grade penalty applied per day of lateness.
 - If you miss the midterm, there is no make-up exam. Similarly, if you miss the in-class IFAT questions, there are no make-ups. With adequate reason provided for your absence, Dr. A-V will re-weight your final exam/remaining IFAT answers accordingly.
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8 Department of Molecular and Cellular Biology Statements

8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.
<http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.uoguelph.ca/~ksomers/>

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The regulations and procedures for [Academic Consideration](#) are detailed in the Undergraduate Calendar.

9.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for [Dropping Courses](#) are available in the Undergraduate Calendar.

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: www.uoguelph.ca/sas

9.6 Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The [Academic Misconduct Policy](#) is detailed in the Undergraduate Calendar.

9.7 Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The [Academic Calendars](#) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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