

Summer 2015
BIO C17
MICROBIOLOGY : THE BACTERIAL CELL

GENERAL INFORMATION

Instructor:

Dr. Shelley Brunt

Office: S563A

416-208-2794

brunt@utsc.utoronto.ca

The philosophy of this course is to provide you the background in basic and clinical microbiology, emphasizing eubacteria and introducing archaeobacteria, viruses and other acellular microorganisms. Emphasis will be placed on characteristics of the above that make a significant number of these microorganisms beneficial and others excellent pathogenic agents of numerous hosts.

This is a lecture course with a laboratory component. Some material in the laboratory will address material that is best presented in a lab setting and will not be addressed in detail in lecture. However, much of the lab and lecture material is interrelated. **The material may not necessarily fall in the same week but during lecture I will highlight related laboratory material. In addition to learning about microorganisms,** in the laboratory component you will be learning skills that are useful in the job market as you will be learning how to cultivate and identify bacteria. These are valuable techniques for jobs requiring microbiology background such as environmental sampling, food industry, biopharmaceuticals, cosmetic industry, government testing labs, blood services labs to name a few.

Communication

The best way to reach me is to drop by and see me, or come by during my office hours. If you wish to see me at a specific time (and not just drop in) outside of the office hours then email me a request for an appointment.

I encourage you to ask questions during lecture. If you have a question about the material, whether it be lecture or laboratory material I encourage you to talk to me in my office or during the laboratories as I will be around each lab period for some of the lab period or to visit me in my office. It is not feasible to give detailed answers to questions regarding material covered in the lecture or laboratory via email. Therefore **I have an open door policy and in addition I hold scheduled office hours. If I am in my office** the door will be open (if the door is closed usually means I am not there) and I will be happy to answer your questions. I will answer emails when I am on campus. I am on campus generally Monday through Friday between 9 and 6 pm. If you send me emails on the weekend I will respond no later than the following Monday **Please use a utonto account for email (I will not answer emails from non-U OF T accounts) and please indicate the course in the subject heading.**

- General announcements and any material needed for the course will be posted on blackboard

Office hours

Tuesday 10 am to 11 am and 2:15 to 3 pm

Wed 4 to 5pm

Thursday 1 to 2 pm

Accessibility

(http://www.utsc.utoronto.ca/~ability/faculty_syllabus.html):

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. I will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff (located in S302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronto.ca.

Academic integrity/plagiarism (from CTL)

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

- Using someone else's ideas or words without appropriate acknowledgement.
- Submitting your own work in more than one course without the permission of the instructor.
- Making up sources or facts.
- Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

- Using or possessing unauthorized aids
- Looking at someone else's answers during an exam or test.
- Misrepresenting your identity.

In academic work:

- Falsifying institutional documents or grades.

- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from myself as your instructor or from other institutional resources (see

The formal lab report will be submitted to turnitin

"Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site".

If you wish to opt out of turnitin, you must do it in writing to Dr. Brunt and provide an electronic copy of your lab report to Dr. Brunt

Mark breakdown:

LECTURE(59%) :

- **Mid-term exam Tuesday June 23, 2015 in class 25%**
 - You must contact me within 48 Hours of missing the midterm and provide me with the UTSC medical certificate filled in by your doctor to be able to write midterm
- **Final exam: covers material from midterm on . One hour is for the laboratory exam see below (3 hr) During exam period TBA 30%**
 - **All lecture exams are multiple choice format**
 - **Participation in lecture through one-minute writes/case studies/reflective practice (if you wish to opt out you may. Please inform me be the fourth week of classes and the 4% will be moved to the final lecture exam (minimum of 80% of assignments completed for full credit) 4%**

LABORATORY: (41%): (attendance is mandatory, you need a medical certificate to be excused see lab outline for further details)

Final exam During exam period (written with the lecture exam, short answer/calculations, short essay, lab exam is cumulative) 15%

Lab reports and assignments

20%

Lab performance (includes participation/presentations/ flow charts/concept maps and reflective practice assignments when appropriate and requested by your TA).

This is not an automatic grade. You must come prepared for lab and participate **6%**

Lab section: Double check your **lab day and room and the course timetable.**

Blackboard will be updated with student lists after class enrolment has ended.

Learn the name of your teaching assistant. Lab related questions will be answered in Dr. Brunt's office hours as well.

Text: **Custom text book: BIOC17 Microbiology** from Pearson custom Library for the biological Sciences Combination of two different textbooks, reducing the cost of the text book. This book can also serve as a resource for BIOD26 and BIOD17. A copy is on reserve in the library

Midterms and final exams are based on material presented in lecture. While I take material from multiple sources **this text book most closely reflects the material and the level of coverage that I give topics.** My goal with the custom text book is for you to get the background needed for lecture and lab at the lowest price possible so I chose relevant chapters from two different Person text books Brock: Biology of Microorganisms and Bauman: Microbiology with diseases by body system

Lab Manual: **M.J. Leboffe and B.E. Pierce.**
Microbiology: Laboratory Theory and Application. Customized
Morton Publishing Company third edition

- **You must have a copy of the lab manual, either used or new.**

Web-sites:

An excellent web-site for all Biology courses is PubMed at www.ncbi.nlm.nih.gov use Search function to get recent research papers on virtually any Biology topic and to search free textbooks

An excellent microbiology source is <https://www.microbelibrary.org/>

Grading:

Several **different types of evaluations** are used in the calculation of your grade in this course. These include: two lecture exams (Midterm and Final: multiple choice format), one final lab exam (short answer/ short essay format) given in the final exam period with the

lecture exam, lab practical (e.g. slides to be handed in and graded), lab reports as well as lab preparation and performance based on in class participation exercises and lecture participation through one-minute writes/case studies.

What you need to know for lecture exams: At the introductory level in Microbiology, there is an emphasis on factual knowledge including the names of important organisms discussed in lecture. Your lecture notes and posted lecture aids are your most important guide to what you need to know. The lecture exam questions will be taken from **the material covered in class**, whether on the **lecture aids**, covered on the board and in any way discussed in class. Although there is no requirement to do so, I do provide a lecture aid prior to each lecture. This lecture aids have significant information because I take the lecture material from multiple sources, including reviews and primary sources and not just your text book. Your textbook will provide the basic resource for material in the course. I provide the lecture aids prior to class to allow you to supplement the notes, listen and process the material covered. I emphasize certain material in lecture, it is important you come to lecture to get a feel for what the important information is (all material in each slide is not equal). I also expect you to supplement the lecture notes with the additional detail I provide in lecture. **In addition there are in class small assignments worth 4% of your grade. If you wish to opt out of these your may by writing to me prior to the forth week of classes. In which case the 4% of the grade will be added to your final exam.**

The lecture aids may be modified in class and you are responsible for any added material. If I cover additional material on the board or via an discussion in lecture it will be your responsibility to take notes. You are responsible for all the material in the lecture and the lecture aids, unless specifically advised otherwise in class

Take home message

To get the most out of the course,

- (i) come to class and attend laboratories (which are required see laboratory outline
- (ii) ask questions
- (iii) go over your lecture and lab notes as soon as possible after each class and
- (iv) if possible, set up a study group with one or two other students in the class (e.g. your lab partners), with whom to discuss these. Studies have shown that the sooner you review your notes, the longer you retain the information ("positive reinforcement").

-

Laboratory component: attendance is mandatory (see lab outline)

Laboratory exam: consist of questions that require answers as short paragraphs and/or short answers . There is emphasis on why you did a procedure and what the outcome was, rather than on exactly how it was done. You must know the bacteria used in lab and why. We use a select few bacteria and they are always used to demonstrate

positive and negative tests, different trends and concepts. Pay attention in lab and record the reasons for the organisms use.

Laboratory grade : will be based on the **Lab Exam** (see above), on Lab performance (see below), **stained slides**, a report on your '**morphological unknown**' , and on **other assignments and lab reports (see laboratory outline)**

Lab participation/preparation : is based on attendance(from the beginning to the end)/small participation assignments/class presentations in the lab (see above); involvement in carrying out the experiments; i.e. does not leave early or sit idle while lab partners do all the work; reads lab before coming to class (clearly is prepared); follows the Rules (see below), does not endanger other students/TAs/technician/glass-washing personnel/ cleaning staff, with unsafe lab practices. If you miss a lab a formal medical certificate will be required to allow you to have a justifiable absence and to hand in any assignment for which you were absent for part or all of the exercise. **You must show your TA you are well prepared for class and engaged in the lab.**

Attendance in labs is mandatory. To be excused from a lab requires a medical certificate. If you have two unexcused absences you forfeit your 6% participation/performance grade and all grades associated with the missed laboratory . One unexcused absence 3% and related grades. More than two unexcused absences and you forfeit all grades related to the laboratory

Note: Your TA is consulted when you request a letter of recommendation from the Professor.

Microscopes :

- You will be assigned to a specific microscope.
- The TAs will instruct you as to how these microscopes are to be handled and cleaned.
- At the end of each lab, the TAs will check that you have removed any oil from the lenses and have put the microscope away correctly.
- **If this is not done properly marks will be deducted from your grade. WHY because the residual oil can severely damage the microscope**

The lecture outline is below. Most of the Topics listed below are given over more than one lecture period.

Check related readings/key words on the front page of each lecture aid.

TOPIC NUMBER

LECTURE TOPIC AND READING ASSIGNMENTS

Topic 1

Course Outline
The Development of Concepts in Microbiology

Topic 2

Microbial Diversity, metabolism

Evolution of cells
The "Endosymbiont Hypothesis"

Topic 3

Overview of Acellular Agents:
Viruses, Prions, Plasmids and
Transposons

Topic 4

Comparison of Selected Features of
Prokaryotic and Eukaryotic Cells

Topic 5

Bacterial Cell Walls and Cell Envelopes:
(I) Peptidoglycan (Murein) Synthesis
(II) Teichoic Acids
(III) Medical Importance of Gram Positive Cell Walls
(IV) Gram Negative Outer Membrane
(V) Lipoproteins and Lipopolysaccharides
(VI) The Endotoxic (Inflammatory / Innate) Responses
(VII) Adaptive (Specific) Immune Responses

Topic 6

Pili, Fimbriae and flagella and role in pathogenesis

Topic 7

Capsules and Biofilms and role in pathogenesis

Topic 8

Endospores and other developmental pathways