**Course Description**
An introduction to the general principles of microbiology including cell structure, physiology, and molecular microbiology utilizing examples from ecologically beneficial as well as industrially relevant and pathogenic microbes.

**Lectures**
**Instructor:**

Diana Mlinar  
**Email:** Diana.Mlinar@ad.umanitoba.ca  
**Office:** 421 Buller Building

**Effective September 1, 2013,** the U of M will only use your university email account for official communications, including messages from your instructors, department or faculty, academic advisors, and other administrative offices. Visit [http://umanitoba.ca/ist/email/studentemailindex.html](http://umanitoba.ca/ist/email/studentemailindex.html) for more information.

**Required material**
Brock Biology of Microorganisms 14th edition (Madigan, Martinko, Bender, Buckley and Stahl).

All course information included lecture presentations can be found on UM Learn at [umanitoba.ca/d2l](http://umanitoba.ca/d2l) You will need your UMNet Id and password to login.

**Course Evaluation**
**Lecture:** (80%)
Both lecture sections will have 2 common mid-terms and a common final exam. All examinations will be multiple choice format.

Tentative examination schedule:
- Midterm 1* 15% 30 Multiple choice questions – **Wednesday, October 4, 530-630**
- Midterm 2* 15% 30 Multiple choice questions – **Wednesday, November 8, 530-630**
- Final exam 50% 80 Multiple choice questions, date and time to be announced (scheduled by the university)

There will be no deferred midterm exam. Students who miss a midterm exam will write a final exam worth 15% more (e.g. 65% versus 50%). Documentation in support of your absence must be provided within 48 hours of the missed exam.

The final exam will cover all material outlined below, lectures and material posted on UM Learn.
Laboratory: (20%)*
Lab term work 8% Includes lab assignments and quizzes.
Lab exam 12% Short answer questions and lab stations, date is given in the lab manual.
* A mark of 10 out of 20 in the lab section is required to pass the course. Lab marks are determined independently of marks obtained on the lecture midterm and final exams.
Because the laboratory and class material are integrated, knowledge of the laboratory material is expected for both the midterm and the course final.

Laboratory
Instructor: Dr. Chris Rathgeber
Office: 418 Buller Building
Email: rathgebe@cc.umanitoba.ca
Phone: 474-9967

Please note: Lab attendance is compulsory. Labs may NOT be made up the following week. If you miss a lab for medical or another legitimate reason, see the instructor as soon as possible (with official documentation) to determine if arrangements can be made to complete the missed lab work and/or assignments. Marks will not be awarded for assignments submitted based on lab work that you did not complete. If you are absent for 2 or more labs without providing official documentation for legitimate absences, you will receive a failing grade for the course.

Approximate grading scheme:

Letter grades are assigned taking into consideration the grade distribution in the class and the University of Manitoba’s descriptors A+ (Outstanding), A (Excellent), B+ (Very Good), B (Good), C+ (Satisfactory), C (Adequate), D (Marginal), F (Failure); see http://umanitoba.ca/student/records/grades/686.html

The grading scheme generally but not exactly follows that used by the Rady College of Medicine https://umanitoba.ca/faculties/health_sciences/medicine/admissions/8847.html.

A+ (>90%), A (80-89.9%), B+ (75-79.9%), B (70-74.9%), C+ (60-69.9%), C (55.0-59.9%), D (50-54.9%), F (<50% cumulative or <50% in final exam).
**Course overview** - Topics may be added or removed due to time constraints.

**Course topics**

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<tr>
<th>Part 1: Microbiology and Microorganisms</th>
<th>Textbook sections</th>
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<tr>
<td>Introduction and major themes of microbiology</td>
<td>1.1 – 1.3</td>
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<tr>
<td>The history of microbiology</td>
<td>1.9 – 1.11</td>
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<tr>
<td>The species concept and classification</td>
<td>13.8, 13.10</td>
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<td>Molecular phylogeny and the tree of life</td>
<td>13.3</td>
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<td>Growth of pure cultures</td>
<td>3.2, 5.9</td>
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<th>Part 2: Microbial cell structure and function</th>
<th>Textbook sections</th>
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<td>Microscopy</td>
<td>1.5 – 1.8</td>
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<tr>
<td>Cells of <em>Bacteria</em> and <em>Archaea</em></td>
<td>2.1 – 2.2</td>
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<tr>
<td>The cytoplasmic membrane and transport</td>
<td>2.3</td>
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<tr>
<td>Cell walls of <em>Bacteria</em> and <em>Archaea</em></td>
<td>2.4 – 2.6</td>
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<tr>
<td>Other cell surface structures and inclusions</td>
<td>2.7 – 2.10</td>
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<tr>
<td>Microbial locomotion</td>
<td>2.11 – 2.13</td>
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<td>Eukaryotic microbial cells</td>
<td>2.14 – 2.16</td>
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<td>The endosymbiotic hypothesis</td>
<td>13.4, 18.1</td>
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<td>Viruses</td>
<td>8.1 – 8.5</td>
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<th>Part 3: Microbial Growth and Nutrition</th>
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<td>Laboratory culture of microorganisms</td>
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<td>Energy classes of microorganisms</td>
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<td>Binary fission</td>
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<td>Population growth</td>
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<tr>
<td>Measuring microbial growth</td>
<td>5.6 – 5.8</td>
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<td>Effect of temperature on microbial growth</td>
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<tr>
<td>Evolution and life at high temperatures</td>
<td>17.11 – 17.13</td>
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<tr>
<td>Other environmental effects on microbial growth</td>
<td>5.12 – 5.14</td>
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<tr>
<td>Control of microbial growth</td>
<td>5.15 – 5.17</td>
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<th>Part 4: Microbial Diversity</th>
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<tr>
<td>Making sense of microbial diversity</td>
<td>15.1</td>
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Domain *Bacteria*

- **Cyanobacteria** | 15.3 |
- **Proteobacteria** | 16.1 – 16.5 |
- **Firmicutes, Tenericutes, and Actinobacteria** | 16.6 – 16.12 |
- **Bacteroidetes** | 16.13 |
- **Chlamydiae, and Planctomycetes** | 16.15 – 16.16 |
- **Deinococcus-Thermus** | 16.20 |
Course topics, continued

**Domain Archaea**
- *Euryarchaeota* 17.1 – 17.4
- *Thaumarchaeota, Nanoarchaeota and Korarchaeota* 17.5 – 17.7
- *Crenarchaeota* 17.8 – 17.10

**Part 5: Immunity and host defense**
- Overview of innate immunity
- Physical and chemical barriers 26.2
- Cells of the immune system 26.3
- Innate immunity 26.1
- Innate response mechanisms 26.5 – 26.7
- Inflammation and Fever 26.8
- Adaptive response properties 27.1
- Primary and secondary immune response 27.3
- Immunogens and antigens 27.2

**Part 6: Antimicrobial drugs and drug resistance**
- Antimicrobial drugs 28.10 – 28.11
- Antimicrobial Drug Susceptibility Testing 27.5
- Antimicrobial drug resistance 28.4

**Part 7: Medical microbiology**
- Normal human microbial interactions 24.1 – 24.5
- Pathogenesis 25.1 – 25.8
- Superantigens: Overactivation of T cells 25.7
- Microbiological identification of pathogens 28.1 – 28.3
- Growth independent diagnostic methods 28.5 – 28.8

**Part 8: Applied Microbiology**
- Food Microbiology various sources
- Genetic engineering and biotechnology various sources
**Student Responsibilities**

It is your responsibility to make sure that all eligibility requirements are met to be registered in this class. This means:

- You have taken the appropriate prerequisites, as noted by the calendar description, or have documented permission from the instructor to waive these prerequisites.
- You have not previously taken, and are not concurrently registered in this course and another that has been identified as "not to be held with".

It is your responsibility to make sure you understand the rules regarding cheating and plagiarism at the University of Manitoba.

- Read the Faculty of Science Statement on Academic Dishonesty (can be found on the last page of this document)
- Refer to the student discipline bylaw and academic integrity information in the University of Manitoba Academic calendar: (http://umanitoba.ca/calendar)
- Read statements on academic dishonesty, including plagiarism, cheating and examination impersonation found on the Faculty of Science webpages: (http://umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html).
- In cases of cheating during examinations, the test in question will be given a grade of 0% and the student will be reported to the appropriate authorities for disciplinary action.

**Faculty of Science Statement on Academic Dishonesty**

The Faculty of Science and The University of Manitoba regard acts of academic dishonesty in quizzes, tests, examinations, laboratory reports or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence.

Acts of academic dishonesty include, but are not limited to bringing unauthorized materials into a test or exam, copying from another individual, using answers provided by tutors, plagiarism, and examination personation.

*Note: cell phones, pagers, PDAs, MP3 units or electronic translators are explicitly listed as unauthorized materials, and must not be present during tests or examinations.*

Penalties that may apply, as provided for under the University of Manitoba's Student Discipline By-Law, range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the University. The Student Discipline By-Law may be accessed at: http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html

Suggested minimum penalties assessed by the Faculty of Science for acts of academic dishonesty are available on the Faculty of Science web-page: http://umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report all incidents of academic dishonesty to the Head of the Department.