

MBIO1010: Microbiology I

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. We also cover the how the body defends against invading pathogens and how we can use drugs to help eliminate infection from the body.

Lectures A01 & A02

Instructor:

Diana Mlinar
Office: 421 Buller Building

Email: Diana.Mlinar@ad.umanitoba.ca
Phone: 474-9293

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> for more information.

Required material

Brock Biology of Microorganisms 16th edition (Madigan, Martinko, Bender, Buckley and Stahl).
Note: the 15th edition of this book is acceptable.

All course information including recorded lecture presentations can be found on UM Learn at umanitoba.ca/umlearn. You will need your UMNNet Id and password to login.

Lecture Delivery

Lectures will be delivered using Zoom for the portion of the term set to take place online. The link and the password to watch the lectures has been emailed to you. The lectures will be recorded and the link will be emailed to students as soon as possible after the lecture period.

With the current pandemic situation, the University followed public health guidance and asked courses to be delivered remotely where possible. The University continues to monitor the developments of the latest pandemic situation and will provide an update as to whether in-person activities can be safely offered as per public health guidelines after February 26.

Course Technological Requirements

Students enrolled in the course must ensure they satisfy the following minimum technological requirements:

- A computing device where one can create and edit documents
- An internet connection capable of streaming videos and downloading software
- Access to a web-cam and microphone

Important Dates

February 4, 2022-Last day to drop classes

February 7, 2022-Last day to add classes

February 22-February 25, 2022-Reading week: no classes

April 25, 2022-Last day to voluntarily withdraw from courses

Course Evaluation

Lecture: (80%)

Tentative examination schedule:

Midterm exam	20%	March 11 th -6:00pm-7:00pm
Final exam	60%	Date and time to be announced (scheduled by the university).

There will be no deferred midterm exams. Students who miss a midterm exam will write a final exam worth 20% more (e.g. 80% versus 60%).

The final exam will cover all material outlined below, lectures and material posted on UM Learn.

Laboratory: (20%) Information provided on page 6 of the syllabus.

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.

A+ (>90%), A (80-89.9%), B+ (75-79.9%), B (70-74.9%), C+ (65-69.9%), C (60.0-64.9%), D (50-59.9%), F (<50%).

Recording Lectures

The instructors of this course hold copyright over all lecture material and exam content. No audio or video recording of the lectures is permitted without prior consent from the instructor. You are not permitted to post any course material to external websites.

Academic Integrity

Academic integrity is taking responsibility for and being honest with your work and respecting the work of others. Since you are a member of the university community, we want you to learn what that responsibility and honesty entails and how we respect the work of others.

The Faculty of Science continues to uphold high standards of academic integrity. We know that our students support us in this endeavour and we count on each and every one of you to do your part. Same academic standards apply online, remote learning, and in class education. We expect all students to strictly adhere to instructions from their professors regarding what resources can and cannot be used during exams, to follow all rules professors decide to set.

To aid professors in ensuring that all forms of assessments have been administered fairly, the University will be electronically monitoring tests, quizzes and examinations, included, but not limited to overseeing chat-rooms, relevant predatory web-sites and, in so doing, we will analyze scholastic evidence of individual exams.

E-monitoring tools will include one of the following: Respondus Lockdown Browser & Respondus Monitor; WebEx; Zoom or Microsoft Teams.

Please carefully review information with regards to academic integrity: **be aware; be proactive; be smart and be honest.**

Academic Integrity Message from Associate Dean Krystyna Koczanski : <https://youtu.be/Ok-lilm4SeE>

The Student Discipline By-Law may be accessed at:

[University of Manitoba - University Governance - Governing Documents: Students \(umanitoba.ca\)](#)

The list of suggested minimum penalties assessed by the Faculty of Science for acts of academic dishonesty is available on the Faculty of Science webpage:

[Microsoft Word - Acad Dishon TABLE RevCSS AdminC Jul2012 WEB.doc \(umanitoba.ca\)](#)

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

<https://universityofmanitoba.desire2learn.com/d2l/le/content/6606/viewContent/1463719/View>

Professional Conduct

We recognize that these are unusual circumstances and some adjustments need to be made when working virtually. At the same time, we do want to remind you that University policies, such as the **Respectful Work and Learning Environment policy**, still apply, as do basic expectations around how students will engage with each other and all members of the University. This means that when participating in classes, online meetings, etc., students are expected to behave professionally, and follow the same basic norms as they would in person, such as being properly clothed, not being impaired, and participating respectfully. **Essentially, if you wouldn't do it in an in-person class, don't do it in a virtual setting.**

Please familiarize yourself with the UM Respectful Work and Learning Environment (RWLE) [UM Respectful Work and Learning Environment \(RWLE\)](#)

Section 2.5(c) of the Student Non-Academic Misconduct and Concerning Behaviour Procedure describes types of inappropriate or disruptive behaviour

[Student Non-Academic Misconduct and Concerning Behaviour Procedure](#)

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".

Course Overview	Textbook sections	
	Brock <i>et al.</i> 15th ed.	Brock <i>et al.</i> 16th ed.
Topics may be added or removed due to time constraints.		
Part 1: Microbiology and Microorganisms		
Introduction and major themes of microbiology	1.1 – 1.3	1.1 – 1.2, 1.4 – 1.5
The history of microbiology	1.9 – 1.11	1.11 – 1.13
Molecular phylogeny and the tree of life	13.3	13.3
The species concept and classification	13.8, 13.10	13.12
Growth of pure cultures	3.2, 5.9	4.2, 4.4
Microscopy	1.5 – 1.8	1.7 – 1.10
Cell shape and size	2.1 – 2.2	1.3
Part 2: Microbial cell structure and function		
The cytoplasmic membrane and nutrient transport	2.3 – 2.4	2.1 – 2.2
Cell walls of <i>Bacteria</i> and <i>Archaea</i>	2.4 – 2.6	2.3 – 2.5
Other cell surface structures and inclusions	2.7 – 2.10	2.6 – 2.8
Microbial locomotion	2.11 – 2.13	2.9 – 2.12
Eukaryotic microbial cells	2.14 – 2.16	2.13 – 2.15
The endosymbiotic hypothesis	13.4, 18.1	13.4, 18.1
Introduction to viruses	8.1 – 8.3	5.1 – 5.4
Part 3: Microbial Growth and Nutrition		
Microbial nutrition and culture media	3.1 – 3.2	4.1 – 4.2
Metabolic classes of microorganisms	3.3	3.1
Measuring cell number	5.6 – 5.8	4.3 – 4.5
Binary fission and the bacterial growth curve	5.1	4.6
Quantitative aspects of growth	5.2 – 5.4	4.7
Effect of temperature on microbial growth	5.9 – 5.11	4.11 – 4.13
An upper temperature limit for life	17.11, 17.13	17.12, 17.14
Other environmental effects on microbial growth	5.12 – 5.14	4.14 – 4.16
Control of microbial growth	5.15 – 5.17	4.17 – 4.19
Part 4: Microbial Diversity		
Making sense of microbial diversity	15.1	15.1
<i>Cyanobacteria</i>	15.3	15.3
<i>Proteobacteria</i>	16.1 – 16.5	16.1 – 16.5
<i>Firmicutes</i> , <i>Tenericutes</i> , and <i>Actinobacteria</i>	16.6 – 16.12	16.6 – 16.12
<i>Bacteroidetes</i>	16.13	16.13
<i>Chlamydiae</i> , and <i>Planctomycetes</i>	16.15 – 16.16	16.15 – 16.16
<i>Deinococcus-Thermus</i>	16.20	16.20
<i>Euryarchaeota</i>	17.1 – 17.2, 17.4	17.1 – 17.4

Cryptic Archaeal Phyla	17.5 – 17.7	17.5 – 17.7
<i>Crenarchaeota</i>	17.9 – 17.10	17.9 – 17.11
Asgard <i>Archaea</i>	External sources	17.8

Part 5: Immunity and host defense

Overview of immunity	26.1 – 26.2, 26.4	26.1 – 26.2, 26.4
Innate response mechanisms	26.5 – 26.7	26.5 – 26.7
Inflammation and fever	26.8	26.8
Adaptive response properties	27.1	27.1
The antibody mediated response	27.2 – 27.3	27.2 – 27.3
Antigen presentation	27.5	27.5
The cell mediated response	27.7 – 27.8	27.7 – 27.8

Part 6: Antimicrobial drugs and drug resistance

Antimicrobial drugs	28.10 – 28.11	28.5 – 28.6
Antimicrobial Drug Susceptibility Testing	28.4	29.4
Antimicrobial drug resistance	28.12	28.7

Part 7: Medical microbiology

Normal human microbial interactions	24.1 – 24.5	24.1 – 24.5
Adherence, colonization and invasion	25.1 – 25.2	25.1 – 25.2
Pathogenicity and virulence	25.3 – 25.4	25.3 – 25.4
Enzymes and exotoxins	25.5 – 25.6	25.5 – 25.6
Cytolytic and superantigen exotoxins	25.7	25.7
Endotoxins	25.8	25.8

Part 8: Applied Microbiology

Topics to be decided by the class	External sources	External sources
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Lab information

Instructor

Dr Chris Rathgeber

Email: chris.rathgeber@umanitoba.ca

Office: 419 Buller building

Phone: 204-474-9967

Office hours: I am available for consultation any time on Mon, Wed, Fri, from 8:30 am to 5:30 pm.

Please email me for an appointment.

Laboratory grade: (20%)*

The lab counts for 20% of your final grade in the course and marks will be allocated as follows:

- Lab safety quiz = 1%
- 6 online lab assignments (1% each) = 6%
- 2 lab quizzes (4% each) = 8%
- In-class lab activities (including pre-labs and marked lab activities) = 5%

* Note that to pass the course, you must:

- Achieve a minimum 10 out of 20 in the lab.
- Complete a minimum of 5 out of 6 online lab assignments.
- Complete 2 in-person lab periods.

Check the lab schedule on UM Learn for quiz and lab assignment due dates.

Online labs

Most labs will be done as online self-study modules, rather than hands on lab work. The labs will usually be available a few days before the scheduled lab date, and you will be able to work on them at a time of your own choosing. To keep you from falling behind on the lab material (ie. leaving all the online labs until the last minute) a short lab assignment will be due at the end of each week. Late lab assignments may be subject to penalty, and no assignments will be accepted greater than 5 working days past the due date. You can find a complete schedule of labs, and the assignment due dates on UM Learn.

In-class lab activities

In addition to the online labs, you will have two in-class lab periods to learn hands on skills in microbiology. Because strict physical distancing will be in effect, each lab section (B01 to B08) will be divided into two groups, and each group will be scheduled to attend the lab for two lab periods between March 1 and April 18.

All in-class activities will be held in room 312 Buller during your regular scheduled lab period. You will be required to bring your own lab coat, permanent marker, and mask. (A pen and a calculator will be useful too.) All other materials you need to complete the labs will be provided. Details of the in-class lab activities, and how to prepare for them, will be available on UM Learn.

Note that you must remain available at your scheduled lab time throughout March and April until all labs have been completed.

If you are sick, or are self-isolating for any other reason, you won't be able to attend the in-class lab periods and will instead be scheduled for a make-up lab. If you are unable to attend your scheduled in-person lab for any reason, you should [contact the instructor](#) as soon as possible to arrange for accommodations. Due to strict distancing measures in effect, make-up labs during term may not be

possible. In this case, make-up labs will be scheduled with the next course offering (ie. Summer term) and you will hold a grade of “incomplete” until your in-person labs have been completed.

Lab exemptions

Lab exemptions are available to students who have previously taken the course and completed the lab section with a minimum grade of 60% in the lab. For permission to register for the lab exemption, or to see if you qualify, [email the instructor](#).

COVID-19

The University of Manitoba (the “UM”) is committed to maintaining a safe learning environment for all students, faculty, and staff. Should campus operations change because of health concerns related to the COVID-19 pandemic or other campus-wide emergency, it is possible that this course will move to a fully remote delivery format. Should the instructor be required to stay at home for an extended period and an alternate instructor not be available, the course may move temporarily to a remote delivery format. In that instance, you may be provided with an asynchronous option to minimize the impact the change may have on your schedule.

PPE and Mask Wearing

In a face-to-face environment, our commitment to safety requires students to observe all physical distancing (2m) and personal protective equipment (PPE) guidelines set by the University (<https://umanitoba.ca/coronavirus>)

While on campus and in class, you must wear PPE (Personal Protective Equipment) as stipulated in current [University policies, procedures, and guidelines](#). Students who fail to comply are subject to disciplinary action in accordance with the [Student Discipline Bylaw](#) and the [Non-Academic Misconduct and Concerning Behaviour Procedure](#).

Medical-grade 3-ply masks are available at many locations on campus, including specific classroom locations, designated by your unit, the Elizabeth Dafoe Library (Fort Garry Campus) and the Brodie Centre main doors (Bannatyne Campus). Additional PPE, if necessary for a specific learning environment, will be provided to you by the teaching unit.

If you do not follow masking and other requirements you will be asked to leave the learning space and may only return to the class already in progress when you have complied with these requirements. Repeated issues will result in disciplinary action as previously noted.

Students should not eat or drink during class time.

Illness

Remember: **STAY HOME IF YOU HAVE SYMPTOMS OR ARE ILL.** If you become sick or are required to self-isolate you should notify your instructor by email so you can develop a plan to complete the course learning outcomes while you are absent.

If you have symptoms, do not come to campus or any UM facilities. Complete the [self-assessment](#) on the Manitoba Public Health site and follow the guidelines, which may include booking a COVID-19 test.

What to do if you become ill while at UM:

1. Leave the classroom, lab or workspace immediately. Continue to wear your mask while leaving the premises and/or while waiting for transportation.
2. Perform hand hygiene (soap and water or hand sanitizer) and avoid contact with others, and minimize contact with the physical environment.

3. Once at home, complete the [MB self-assessment](#) and follow the directions that are provided.
4. Inform your supervisor(s), instructor(s) or, if in residence, the appropriate individual.
5. You must remain off campus and all UM facilities until cleared to return in accordance with self-assessment, testing results, or MB Health requirements.

Recommended transportation options (in order):

1. Drive yourself home.
2. Pick-up by family or friend – remember to keep your mask on and to distance as much as possible, and where possible, open a window to improve ventilation.
3. Pickup by taxi/Uber:
 - Remain masked and perform hand hygiene before entering the vehicle.
 - Avoid touching the inside of the vehicle
 - Keep your mask on for the duration of the ride
 - Where possible, open a window to improve ventilation.
4. Winnipeg Transit buses - Winnipeg Transit has indicated that individuals that are ill **must not use Transit**.

How to succeed in your science courses?

The Faculty of Science is committed to delivering the high quality education our students have come to expect. We also want to ensure that you set yourself up for success. We want you to succeed!

#1. We recommend that you consider the stated requirements of this course..... While we are making reasonable accommodations for students, you will want to plan ahead

accordingly and be flexible.

#2. Use the [Registration Revision Period](#) to evaluate the course syllabus, and the course content. Some courses will have interactive activities and assessments such as tutorials, online labs, and online quizzes at scheduled times throughout the term in addition to/in lieu of examinations. Make sure that your current situation will allow you to participate in all courses to the fullest. ***This is particularly important for students who will be joining us from different time zones.***

Some courses may have a mandatory on-campus component. Student safety is very important to us and the University of Manitoba, operating in close collaboration with Manitoba Public Health, has authorized these components. The primary aim of our in- person components is to maximize the education and training of our students whose future is at risk without it. The University of Manitoba is implementing many safety measures to ensure the safety of students and staff while on campus, such as requiring face masks (three-ply disposable ones), proper hand hygiene, physical distancing, and sanitation of high-touch surfaces with ethanol solution or disinfectant wipes to help mitigate the risks associated with contracting COVID-19.

If you know that you will be unable to participate in an on-campus component because, for example, you are not currently in Winnipeg and are unable to come to Winnipeg, you, or someone you live with, is immunocompromised, or you are simply uncomfortable with attending, you are strongly urged to withdraw from the course during the Registration Revision Period.

Note: during the registration revision period you will be able to drop/add courses without any financial consequence. Speak directly with instructors if you have any questions specific to their course.

#3. Take time to consider the workload associated with the course schedule you are planning. Remote learning has its challenges and your ability to adapt and be flexible in this context is very important. Be realistic about other commitments and distractions that are part of everyday life, and make your course selection decisions accordingly. If you want to discuss anything, the academic advisors are available – email: sciadv@umanitoba.ca to request an appointment.

Timeline for electronic inquiry response:

Please be respectful of the specific reply timelines that faculty members or staff members set for your course. Generally, when a faculty member or staff member receives an electronic inquiry from you they will try to reply within one or two business days of receipt of the email. It is understood that sometimes the reply may come sooner or in some instances later than this, with a normal response envelope between 1-3 business days.

Medical Notes

Students who are unable to meet a course requirement due to medical circumstances are currently not required to submit medical notes. However, students are required to contact their instructor or academic advisor by email to inform of the missed work and make arrangements for extensions, deferrals, or make-up assignments. Please follow these guidelines, if you are unable to meet an academic requirement for your courses.

- Contact your instructor for term work such as a class, quiz, midterm/test, assignment, lab;
- Contact an advisor in your faculty of registration for a missed final exam (scheduled in the final examination period);
- Inform your instructor/advisor as soon as possible, do not delay. Note for final exams, students must contact within 48 hours of the date of the final exam.
- Email your instructor/advisor from a U of M email address, and include your full name, student number, course number, and academic work that was missed within 48 hours of the date of the missed examination.

Please note that circumstances that result in missing multiple course assignments/tests/classes may require medical documentation (e.g., Authorized Withdrawal, Tuition Fee Appeal, Leave of Absence, or accessibility-related accommodations). Students are advised to speak with an **advisor in their faculty/college/school of registration** in this case.

Voluntary Withdrawal (VW), Authorized Withdrawal (AW) and Limited Access

Policies

VW: Students have the opportunity to voluntarily withdraw (VW) from this class up to April 25, 2022. By then, you will have received feedback to allow you to assess your progress and determine if you are achieving the grade you are aiming for in this course. If you are unlikely to be successful in the course, or you are not achieving the grade that you are aiming for, you should consider a VW from the course. You may contact me to review your progress in more detail, or you may discuss the VW option with a Faculty academic advisor. Students enrolled in the course after the VW deadline will be assigned a final grade.

http://umanitoba.ca/u1/know_yourself/573.html

AW: At times medical or compassionate circumstances arise in a student's life that prevent them from performing as they would in normal circumstances. If you are in this position, please contact a Faculty academic advisor to discuss your options. Be prepared to provide documentation, which supports your situation.

http://www.umanitoba.ca/student/resource/student_advocacy/authorized-withdrawal/index.html

Limited Access Policy: The Senate Executive Committee approved, on behalf of Senate that section 2.5(a) of the Repeated Course Policy to be **suspended indefinitely**. **Sec 2.5 refers to Limited Access**. Suspension of LAP means that you can retake the course you have decided to VW in the next semester.

Using Copyright material

Please respect copyright. We will use copyrighted content in this course. University guidelines state that copyrighted works, including those created by me, are made available for private

study and research and must not be distributed in any format without permission. Since it is illegal, do not upload copyrighted works to a learning management system (such as UM Learn), or any website, unless an exception to the Copyright Act applies or written permission has been confirmed. For more information, see the University's Copyright Office website at <http://umanitoba.ca/copyright/> or contact um_copyright@umanitoba.ca.

Students Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation. Student Accessibility Services <http://umanitoba.ca/student/saa/accessibility/>

520 University Centre, 204-474-7423 Student_accessibility@umanitoba.ca