

<b>Course ID:</b>	<b>Course Title:</b>	<b>Fall 2021</b>
<b>BIO 241</b>	<b>General Microbiology</b>	<b>Prerequisite: BIO 131 and BIO 133</b>
		<b>Credits: 3</b>

Class Information		Instructor Information		Important Dates	
<b>Delivery:</b>	In Class	<b>Instructor:</b>	Dr. Chris Wang	<b>First Day of Classes:</b>	September 8, 2021
<b>Days:</b>	Tuesday and Thursday	<b>Email:</b>	<a href="mailto:chris.wang@ambrose.edu">chris.wang@ambrose.edu</a>	<b>Last Day to Add/Drop:</b>	September 19, 2021
<b>Time:</b>	8:15 – 9:30 AM	<b>Phone:</b>	(403) 410-2000 ext. 6910	<b>Last Day to Withdraw:</b>	November 22, 2021
<b>Room:</b>	L2084	<b>Office:</b>	L2113	<b>Last Day to Apply for Extension:</b>	November 23, 2021
<b>Lab/Tutorial:</b>	Instructor: Jennifer Neufeld ( <a href="mailto:Jennifer.Neufeld@ambrose.edu">Jennifer.Neufeld@ambrose.edu</a> ) ~3 hours/week Monday (3:15 – 6:15 AM) A2145	<b>Office Hours:</b>	by appoint (open door policy)	<b>Last Day of Classes:</b>	December 13, 2021
<b>Final Exam:</b>	<b>Date:</b> Thursday, December 16 <b>Time:</b> 9 am – 12 pm <b>Room:</b> L2084				

### Important Dates and Information

For a list of all important dates and information regarding participating in classes at Ambrose University, please refer to the Academic Calendar at <https://ambrose.edu/academic-calendar> .

### Course Description:

Microbiology explores the biology of microorganisms, namely viruses, bacteria, unicellular and microscopic multicellular eukaryotes. The course will review fundamental information about the biology of these organisms and will expand this knowledge base with microbial genetics, diversity and ecology. The field of applied microbiology will also be explored in topics regarding health, industry and the environment. The accompanying laboratory component will introduce a variety of laboratory techniques to identify microorganisms.

### Expected Learning Outcomes:

At the end of the course, students should have acquired the following skills:

1. Understand the basic features of microbes.
2. Understand and appreciate the diversity of microbes.
3. Comprehend the intimate interaction between humans and microbes in health, industry and the environment.
4. Competently handle and experiment on bacteria.

## Require Textbook and Digital Learning Resources:

- Madigan, Bender, Buckley, Sattley, and Stahl. Brock Biology of Microorganisms. 16<sup>th</sup> Edition. Pearson. ISBN 13: 978-0-13-426192-8.
  - eTextbook + Mastering Microbiology – ISBN: 9780135845684
  
- it is required to sign up for **Mastering Microbiology**:
  - please refer to “Mastering Microbiology Registration - F2021.pdf” for Mastering Microbiology registration
  - hyperlink for registration: [www.pearson.com/mastering](http://www.pearson.com/mastering)
  - instructor’s course ID: **wang34408**
  
- it is required to sign up for **Poll Everywhere** in-class response system at (*free subscription*)
  - **free** subscription at <https://www.polleverywhere.com/>
  - <https://www.polleverywhere.com/guides/student>
  - Poll Everywhere apps are available for iPhone and Android

**Course Schedule:**

The following schedule provides a general guideline and timetable for topics and tests. It may change depending on the progress throughout the semester.

Currently, lectures are designated to be delivered in person. However, please be aware that the delivering mode, the syllabus, schedule, and assessment and evaluation items and methods may be modified abruptly as the COVID pandemic evolves. Any changes will be communicated to you via Ambrose email and Moodle announcement. Please regularly check for any changes to the syllabus, schedule, or whether classes are moved to online format.

Date	Lecture Topic	Readings (Appling et. al.)
Sept. 09	Introduction to BIO 241	
Sept. 14	Topic 1: The World of Microorganisms	Ch. 1
Sept. 16	Topic 1: The World of Microorganisms	
Sept. 21	Topic 2 - Microbial Cell Structure and Function	Ch. 2
Sept. 23	Topic 2 - Microbial Cell Structure and Function	
Sept. 28	Topic 2 - Microbial Cell Structure and Function	
Sept. 30	Topic 2 - Microbial Cell Structure and Function	
Oct. 05	Topic 3 - Microbial Growth	Ch. 5 and 7
Oct. 07	Topic 3 - Microbial Growth	
Oct. 12	Topic 3 - Microbial Growth	
Oct. 14	Topic 3 - Microbial Growth	
Oct. 19	Topic 4 - Microbial Metabolism	Ch. 3
Oct. 21	Topic 4 - Microbial Metabolism	
Oct. 26	Topic 4 - Microbial Metabolism	
Oct. 28	Topic 5 - Molecular Information Flow	Ch. 4
Nov. 02	Topic 5 - Molecular Information Flow	
Nov. 04	<b>Midterm</b>	
Nov. 09	<i>No Class due to Fall Reading Week</i>	
Nov. 11	<i>No Class due to Fall Reading Week</i>	
Nov. 16	Topic 5 - Molecular Information Flow	

<b>Nov. 18</b>	Topic 6 - Bacterial and Archaeal Genomes	Ch. 11
<b>Nov. 23</b>	Topic 6 - Bacterial and Archaeal Genomes	
<b>Nov. 25</b>	Topic 7 - Virus and Bacteriophage	Ch. 8
<b>Nov. 30</b>	Topic 7 - Virus and Bacteriophage	
<b>Dec. 02</b>	Topic 8 – Biotechnology	Ch. 12
<b>Dec. 07</b>	Topic 8 – Biotechnology	
<b>Dec. 09</b>	Topic 9 - Microbiology and Pathogenesis	Ch. 25

**Laboratory Schedule:**

Date	Laboratory of the Week
Sept. 13	Introduction to BIO 241 Lab
Sept. 20	Lab 1: Microorganisms are Ubiquitous
Sept. 27	Lab 2: Microscope and Culturing Techniques
Oct. 04	Lab 3: Staining Techniques
Oct. 11	<b><i>No Lab due to Thanksgiving</i></b>
Oct. 18	Lab 4: Bacterial Conjugation
Oct. 25	Lab 5: Understanding CRISPR-Cas and the Use of Auxotrophic Microorganisms
Nov. 01	Lab 6: Expression of Cas9 with Galactose Case Study 1: CRISPR Technology and Lab Report Writing Workshop
Nov. 08	<b><i>No Lab due to Fall Reading Week</i></b>
Nov. 15	Lab 7: Selection of Antibiotic Resistant <i>Saccharomyces cerevisiae</i>
Nov. 22	Lab 8: Genotyping of CRISPR Modified <i>Saccharomyces cerevisiae</i> by PCR
Nov. 29	Lab 9: Agarose Gel Analysis of PCR Reactions
Dec. 06	Case Study 2: Antibiotic Resistance

### Other Requirements:

- students are encouraged to read the corresponding chapter prior to attending lectures
- students are encouraged to generate their own notes according to their learning styles
- all lecture PowerPoints and tutorial assignments will be posted on Moodle
- laboratories are designed: (1) to understand the landmark experiments in cellular and molecular biology; and (2) to review the lecture topics and key concepts in preparation for tests. Tutorial assignment submission deadlines are on the day of the tutorial

### Attendance:

- doctor's notes are required for deferred midterm and final exams
- **lab attendance is required!**

### Assessment and Evaluation:

Evaluation Methods	Due Date	Weighting
Mastering Microbiology Assignments	multiple	15%
Midterm Exam	November 4, 2021	25%
Lab: Case Study	TBD	5%
Lab: Assignments from Lab 1 - 4	TBD	5%
Lab: CRISPR Paper	TBD	20%
Final Exam (cumulative)	December 16, 2021	30%
Total		100%

#### **I. Mastering Microbiology Assignments: (15%)**

- all Mastering Microbiology assignments are due at 11:59 PM (MST) of the dates indicated below
- pre-lecture assignment: allow to take assignment up to 3 times and keep the best score
- post-lecture assignment: only 1 attempt is allowed
- ***no deferred or late assignments will be accepted unless pre-arrangement was made***

Topics	Corresponding Chapter	Assignment Due Dates	
		Pre-Lecture	Post-Lecture
2	2	September 20	October 12
3	5 and 7	October 04	October 24
4	3	October 18	November 01
5	4	October 27	November 20
6	11	November 17	November 30
7	8	November 24	December 05
8	12	December 01	<i>Optional*</i>

*\* mark in this assignment can be used to replace the lowest Mastering Microbiology assignment*

## **II. Laboratory Component: (30%)**

- a passing grade in WHMIS training is required prior to the attendance of all laboratory sessions
- lab exercises and case studies are worked among a group of 2 – 3 students
- read and do the required questions before coming to the lab session
- type out answers of lab exercises and case studies, and submit a hard copy to Jennifer Neufeld
- assignment and case study are due on the day assigned and attendance is required to receive the marks if it is to be completed in class or in lab

## **CRISPR Experiment Section:**

- the week after the experiment, each group is expected to submit a “draft” write up on the material and methods, result, and discussion of the experiments performed in the previous week
- the lab instructor will assign passed/failed designation to the draft and provide quick feedback for further revision
- a 1% of the final mark will be deducted if the bench was not cleaned properly before leaving the lab
- late assignment policy policy is 33% deducted per day late

## **III. Midterm Exam: (25%)**

- focus on understanding the biological concepts rather than detail memorization
- NO make-up or deferred exam unless evidence of legitimate excuse, such as doctor’s notes, is presented

## **IV. Final Exam: (30%)**

- final exam is *comprehensive (i.e. cumulative)*

**Grade Summary:**

<b>Percent (%) to Letter Grade Conversion</b>	<b>Grade</b>	<b>Grade Point</b>	<b>Description</b>
95.00% - 100%	A+	4.0	Excellent
87.00% - 94.99%	A	4.0	
80.00% - 86.99%	A-	3.7	
77.00% - 79.99%	B+	3.3	Good
73.00% - 76.99%	B	3.0	
70.00% - 72.99%	B-	2.7	
67.00% - 69.99%	C+	2.3	Satisfactory
63.00% - 66.99%	C	2.0	
60.00% - 62.99%	C-	1.7	
55.00% - 59.99%	D+	1.3	Minimal Pass
50.00% - 54.99%	D	1.0	
00.00% - 49.99%	F	0	Fail

Because of the nature of the Alpha 4.00 system, there can be no uniform University-wide conversion scale. The relationship between raw scores (e.g. percentages) and the resultant letter grade will depend on the nature of the course and the instructor's assessment of the level of each class, compared to similar classes taught previously.

Please note that final grades will be available on student registration system. Printed grade sheets are not mailed out.



**Other:**

**Classroom Etiquette:**

**Electronic Devices**

Although computers and tablets can be used in the class for taking lecture notes, cell phone usage is not permitted. Please turn cellular phones off - it is very distracting to hear someone's phone go off in class. Texting and movie watching are prohibited in class.

**Attend every class**

You will find that students who attend every class, listen to the instructor and take good notes will be more likely to pass (with a higher grade). If you have an emergency or illness, please contact me ahead of time to let me know that you will be absent.

Important note: if you miss a class it is your responsibility to meet with the instructor, outside of regular class time, to determine a plan to make up the missed work.

**Get to Class On Time**

Students, who walk into the classroom late or leave early, distract other students and disrupt the learning environment.

**Do Not Have Private Conversations**

The noise is distracting to other students. Also, talking to classmates during lecture and presentations disrupts the normal learning environment.

**Do Not Get Up and Walk Out Halfway Through the Class**

It disturbs people and gives the unmistakable impression that you don't respect the class, the other students or the instructor. The instructor has the right to finish his or her thought at the end of the class period and conclude the class in an orderly fashion without people standing up and walking out

**Your Classmates Deserve Your Respect and Support**

Others may have different ideas and opinions from yours, they may ask questions you perceive to be "stupid," but they deserve the same level of respect from you as you wish from them.

### **Plagiarism:**

Plagiarism is a very serious academic offence that involves presenting work in a course as if it were the result of one's own study and investigation when, in fact, it is the work of someone else. Plagiarism takes place when:

- an essay or other work is copied from another source, including your peer's work, and submitted as one's own
- parts of a work, including words, ideas, images or data, are taken from a source without acknowledgement of the originator
- work presented for one course is also submitted for another course without prior agreement of the instructors involved
- another person prepares the work that is submitted as one's own
- substantial editorial or compositional assistance from another person is received on work that is submitted as one's own

### **Cheating:**

Cheating is also a very serious academic offence. Cheating on examinations, assignments and/or labs may take a number of forms, including:

- tampering or attempting to tamper with examination scripts, class work, grades or class records
- obtaining unauthorized assistance from anyone during the course of an examination
- impersonating another student during examinations
- falsifying or fabricating lab reports
- communicating with other students during an examination
- bringing unauthorized written material or electronic devices to an examination
- possessing, distributing, or attempting to possess or distribute unauthorized material in respect to examinations
- attempting to read the examination papers of other students
- deliberately exposing one's own examination papers to another student

## Ambrose University Important Information:

### Communication

All students have received an Ambrose e-mail account upon registration. It is the student's responsibility to check this account regularly as the Ambrose email system will be the professor's instrument for notifying students of important matters (cancelled class sessions, extensions, requested appointments, etc.) between class sessions.

### Exam Scheduling

Students who find a conflict in their exam schedule must submit a Revised Examination Request form to the Registrar's Office by the deadline date; please consult the Academic Calendar. Requests will be considered for the following reasons only: 1) the scheduled final examination slot conflicts with another exam; 2) the student has three final exams within three consecutive exam time blocks; 3) the scheduled final exam slot conflicts with an exam at another institution; 4) extenuating circumstances. Travel is not considered a valid excuse for re-scheduling or missing a final exam.

### Standards of Behaviour in the Classroom Setting

Learning is an active and interactive process, a joint venture between student and instructor and between student and student. Some topics covered within a class may lead to strong reactions and opinions. It is important that Students understand that they are entitled to hold contradictory beliefs and that they should be encouraged to engage with these topics in a critical manner. Committing to this type of "active learning" significantly increases the learning experience for both teacher and student, and reflects the Christian imperative to pursue truth, which lies at the heart of the Ambrose educational experience. However, active discussion of controversial topics will be undertaken with respect and empathy, which are the foundations of civil discourse in the Classroom Setting. Primary responsibility for managing the classroom rests with the instructor. The instructor may direct a student to leave the class if the student engages in any behaviour that disrupts the classroom setting. If necessary, Ambrose security will be contacted to escort the student from class. Please refer to your professor regarding their electronic etiquette expectations.

### Academic Integrity

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Academic dishonesty is taken seriously at Ambrose University as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to acknowledge to another person's ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university. Students are expected to be familiar with the policies in the current Academic Calendar that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are

reported to the Academic Dean and become part of the student's permanent record.

### Academic Policies

It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Academic Calendar. The academic calendar can be found at <https://ambrose.edu/content/academic-calendar-2>

### Privacy

Personal information (information about an individual that may be used to identify that individual) may be required as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at [privacy@ambrose.edu](mailto:privacy@ambrose.edu).

### Coursework Extensions

Should a request for a time extension on coursework exceed the end of the term, a *Coursework Extension Application* must be completed and submitted to the Office of the Registrar. The extension (if granted) will be recorded on the student record. Extensions are granted at the discretion of the instructor and are normally granted for 30 days beyond the last day of the term.

Normally, Course Extension Applications will be considered only when all of the following conditions are met:

- the quality of prior course work has been satisfactory;
- circumstances beyond your control, such as an extended illness or death of a family member, make it impossible for you to complete the course work on time; and
- you submit *Coursework Extension Application* to the Office of the Registrar on or before the deadline specified in the Academic Schedule.

If granted, time extensions do not excuse you from a final examination where one has been scheduled for the course.

A temporary grade of TX will be assigned until a final grade is submitted in accordance with the new deadline. A final grade of F will apply to:

- all course work submitted after the end of the semester unless a coursework extension has been granted; and all course work submitted after the revised due date provided by an approved extension to coursework.

## Academic Success and Supports

### Accessibility Services

Academic accommodation is provided to Ambrose students with disabilities in accordance with the Alberta Human Rights Act and the Canadian Charter of Rights and Freedoms. Provision of academic accommodation does not lower the academic standards of the university nor remove the need for evaluation and the need to meet essential learning outcomes. Reasonable accommodations are tailored to the individual student, are flexible, and are determined by considering the barriers within the unique environment of a

postsecondary institution. It can take time to organize academic accommodations and funding for disability-related services. Students with a disability who wish to have an academic accommodation are encouraged to contact Accessibility Services as early as possible to ensure appropriate planning for any needs that may include accommodations. Staff can then meet with students to determine areas to facilitate success, and if accommodations are required, ensure those accommodations are put in place by working with faculty.

### **Ambrose Writing Services**

Ambrose Writing services provides academic support in the four foundational literacy skills—listening, speaking, reading, and writing. It also assists students with critical thinking and the research process. Throughout the academic year, students can meet with a writing tutor for personalized support, or they can attend a variety of workshops offered by Academic Success. These services are free to students enrolled at Ambrose University. Academic Success serves all students in all disciplines and at all levels, from history to biology and from theatre to theology. To learn more, please visit <https://ambrose.edu/writingcentre>

### **Ambrose Tutoring Services**

Ambrose Tutoring Services provides support in specific disciplinary knowledge, especially in high-demand areas such as chemistry, philosophy, math and statistics, and religious studies. These tutors also coach students in general study skills, including listening and note-taking. During the academic year, Ambrose Tutoring Services offers drop-in tutoring for courses with high demand; for other courses, students can book a one-to-one appointment with a tutor in their discipline. These services are free to students enrolled at Ambrose University. To learn more, please visit <https://ambrose.edu/tutoring>.

### **Mental Health Support**

All of us need a support system. We encourage students to build mental health supports and to reach out when help is needed.

#### On Campus:

- Counselling Services: [ambrose.edu/counselling](https://ambrose.edu/counselling)
- Peer Supportive Listening: One-to-one support in Student Life office. Hours posted at [ambrose.edu/wellness](https://ambrose.edu/wellness).
- For immediate crisis support, there are staff on campus who are trained in Suicide Intervention and Mental Health First Aid. See [ambrose.edu/crisissupport](https://ambrose.edu/crisissupport) for a list of staff members.

#### Off Campus:

- Distress Centre - 403-266-4357
- Sheldon Chumir Health Care Centre - 403-955-6200
- Emergency - 911

### **Sexual Violence Support**

All staff, faculty, and Residence student leaders have received *Sexual Violence Response to Disclosure* training. We will support you and help you find the resources you need. There is a website with on and off campus supports – [ambrose.edu/sexual-violence-response-and-awareness](https://ambrose.edu/sexual-violence-response-and-awareness).

#### Off Campus:

- Clinic: Sheldon Chumir Health Centre - 403-955-6200
- Calgary Communities Against Sexual Abuse - 403-237-5888

**Note:** Students are strongly advised to retain this syllabus for their records.