McMaster University | Department of Biology

BIOLOGY 2EE3
Introduction to Microbiology and Biotechnology
Winter 2021 Course Outline

Course Details

INSTRUCTOR: Dr. Turlough Finan, LSB-537 (**finan@mcmaster.ca**)
OFFICE HOURS: Location/platform, day, and time to be determined. Appointments can be made by contacting Dr. Finan

COURSE AND LAB COORDINATOR: Alastair Tracey, LSB-119 (**bioyr2@mcmaster.ca**)

LAB TAs: To be determined (TBD).

LECTURES: Mondays and Thursdays, 12:30-1:20, Tuesdays 1:30-2:20, location TBD.

LABORATORIES: Monday to Thursday, 8:30-11:20 or 2:30-5:20 in LSB 104

Course Description

Microbial structure, genetics, metabolism, and evolution. Overview of agricultural, medical, environmental, and industrial microbiology. Covers key concepts, fundamental principles, and common research tools in microbiology
Prerequisite(s): ISCI 1A24, or Biology 1A03, Biology 1M03, Chemistry 1A03, Chemistry 1AA3, or registration in Level III Chem Engineering and Bioengineering. If not already completed, BIOSAFE 1BS0 (or HTHSCI 1BS0) must be completed prior to the first lab.

The course will be delivered via live lectures and in-person laboratory activities. The midterm test will occur in the evening outside of scheduled lecture time. Laboratories will occur during the term as scheduled and seen in each student's Mosaic timetable.

Course Learning Objectives

By the end of this course students will:

1. Have a broad fundamental knowledge and appreciation of microbiological concepts and applications.

2. Be able to distinguish key differences between major groups of microorganisms.

3. Have a basic understanding of the structure, physiology, biochemistry and genetics of microorganisms.

4. Have a basic understanding of the evolution of microorganisms.

5. Understand the importance of microorganisms in the environment and in agriculture, medicine and industry.

6. Be able to use basic microbiology lab equipment and perform microbiological lab techniques aseptically.

7. Be able to interpret and analyse laboratory results and produce written reports on experiments and observations.

8. Be prepared for upper-level courses on more advanced microbiological topics and/or experimentation.

Course Schedule

IMPORTANT DATES:

Jan. 6	Classes begin
Jan. 7	First Bio 2EE3 lecture
Jan. 11-15	Lab 1 for ODD numbered lab sections
Jan. 18-22	Lab 1 for EVEN numbered lab sections
Feb. 15-21	Reading Week
Feb. 23	Midterm exam
Apr. 8	Last Bio 2EE3 lecture
Apr. 9	Classes end

LECTURE TOPICS

This course provides students with a broad overview of microbiology and an understanding of the key concepts, fundamental principles, and common research tools in microbiology. The topics include the history and scope of microbiology, the fundamentals of microbial cell biology, cell structure, reproduction, genetics, metabolism, ecology, evolution, diversity, systematics, genomics, and overviews of the applied fields in agricultural, medical, environmental and industrial microbiology. This course also prepares students for more advanced courses offered at the third and fourth-year levels, e.g. Microbial Genetics (MolBiol 3O03), Techniques in Molecular Genetics (MolBiol 3V03), Microbial Diversity & Environmental Biotechnology (Bio 4PP3), and Medical Microbiology (MolBiol 4P03). These courses systematically build knowledge in all areas of modern microbiology.

LAB DETAILS

The laboratory periods are mandatory and are intended to familiarize students with the important basic methods used by microbiologists and essentially all molecular biologists. The main methods include aseptic techniques, isolation of specific microorganisms from mixed populations, microscopic examination of microorganisms, microbial physiology, the polymerase chain reaction, gel electrophoresis, DNA sequence analyses, and yeast fermentation. The laboratory manuals will be posted as PDF files on the course's Avenue website for downloading and printing. Completion of the labs and lab reports is a requirement for passing the course.

LAB SCHEDULE: Biology 2EE3 labs will not occur during the week of January 4 – 8.

DATES	LAB	TOPIC	ASSESSMENT
Week of Jan. 11**: ODD#** **Week of** Jan. 18**: EVEN#**	**Lab 1**	**Identifying bacteria by traditional means**	**Informal report**
Week of Jan. 25**: ODD#** **Week of** Feb. 1**: EVEN#**	**Lab 2**	**Working with viruses**	**Informal report**
Week of Feb. 8: ODD#	**Lab 3**	**Conjugation and antibiotic resistance**	**Formal lab report**
Week of Feb. 15-19		**MIDTERM RECESS**	
Week of Feb. 22**: EVEN#**	**Lab 3**	**Conjugation and antibiotic resistance**	**Formal lab report**
Week of Mar. 1**: EVEN #** **Week of** Mar. 8**: ODD#**	**Lab 4**	**Fermentation, identification by molecular means**	
Week of Mar. 15**: EVEN#** **Week of** Mar. 22**: ODD#**	**Lab 5**	**DNA gel electrophoresis**	**Informal report**

Please check your schedule to ensure that you know which lab room your section is assigned to. Students must attend the lab section to which they have been assigned. Those with **ACADEMIC CONFLICTS ONLY** should arrange their own lab change through Mosaic prior to the add/drop date. **It is your responsibility to attend the correct lab section and room**. **NOTE: If you are absent from your lab, you may not attend another lab section without previously contacting the course coordinator. If you cannot attend another lab section, you will be required to submit an MSAF.**

In the event of a storm closure check Avenue to Learn for alternate arrangements for those lab sections. Specific information may be sent to your McMaster email address. **NO OTHER EMAIL ADDRESSES WILL BE USED**.

IMPORTANT NOTE

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If any modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the

opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes. Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.

Course Materials

RECOMMENDED TEXTBOOK: Wessner, Dupont and Charles (2013). Microbiology. John Wiley & Sons. ISBN 978-0-471-69434-2 or Wessner, Dupont, Charles and Neufeld (2016). Microbiology 2nd edition. John Wiley & Sons. Etext ISBN 9781119320661 or loose-leaf text ISBN 9781119498551 available via The Campus Store.

Lab manuals for each lab will be made available on Avenue to Learn and must be brought to the lab.

Course Evaluation

The Biology 2EE3 final grades will be calculated based upon the following course assessments:

MARKS:	30%	Midterm exam (Tuesday, February 23, 7:00 pm to 9:00 pm)
	12%	Informal laboratory reports (see the lab details for a detailed breakdown)
	10%	Formal laboratory report (see the lab details for a detailed breakdown)
	3%	Laboratory notebook and participation
	45%	Final Exam; exam is cumulative

If the midterm and final exam cannot be administered in-person, the course may use online proctoring software for the midterm and final exam. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during midterms or final exams. This software may be required to be installed before the midterm/final exam begins.

Please discuss any uncertainties about term grades with the Course Coordinator **before the final exam is written**. Final grades obtained for 2EE3 will be converted according to the scheme used at McMaster University.

90-100%	A+	12	63-66%	C	5
85-89%	A	11	60-62%	C-	4
80-84%	A-	10	57-59%	D+	3
77-79%	B+	9	53-56%	D	2
73-76%	B	8	50-52%	D-	1
70-72%	B-	7	0-49%	F	0
67-69%	C+	6			

Requests for Relief for Missed Academic Term Work

POLICY REGARDING MISSED WORK IN THE FACULTY OF SCIENCE

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

View the McMaster Student Absence Form (MSAF) for more information.

Undergraduate students who have missed academic work resulting from a medical or personal situation, lasting up to 3 calendar days, may request relief, once per term, without documentation, using the McMaster Student Absence Form (MSAF). Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, please put Alastair Tracey as the contact email (bioyr2@mcmaster.ca). Please note that the MSAF may not be used for term work worth 25% or more, nor can it be used for the final examination.

POLICY ON LATE LAB REPORTS

Lab reports are due at 2:30 pm, on their respective deadlines after you performed the lab exercises. Lab reports must be submitted in hard copy to the correct Bio 2EE3 dropbox on the first floor of LSB (near the elevators). It is your responsibility to ensure they are placed in the correct dropbox. Reports received after the deadline or found later in the wrong dropbox, will be penalized at 10% per day. **If a MSAF is provided, students will receive a 2-day extension on the due date of the lab report. IMPORTANT NOTE** – Students MUST complete ALL of the lab components to receive credit for Biology 2EE3.

POLICY ON MISSED TESTS

The weight of a missed midterm will be added to the value of the final exam if a MSAF is provided. Missing the midterm without a MSAF will receive a grade of zero.

Academic Integrity

Attention is drawn to the Statement on Academic Ethics and the Senate Resolutions on Academic Dishonesty as found in the Senate Policy Statements distributed at registration and available in the Senate Office. Any student who infringes any one of these resolutions will be treated according to published policy.

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity**. It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at https://secretariat.mcmaster.ca/university-policies-procedures- guidelines/

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work. While students may find it helpful to discuss assignments with each other, it is not acceptable to prepare common answers. **Where laboratories require you to work in groups the data obtained will be all the same, but your treatment of it (tables, graphs, Results & Discussion) must be your own individual work.** Your answers to theory questions, results & discussion & computer derived graphs should be your own. **For example, you and your lab partner(s) cannot print/insert 2 to 4 versions of the same graph(s) in your lab reports even though you are working with the same data. Each student must create and print/insert their own versions of the graphs in biology labs even though their data is the same as their lab partners.**
3. Copying or using unauthorized aids in tests and examinations.

Authenticity/Plagiarism Detection

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. Avenue to Learn, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.).** For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

Courses with an On-line Element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, Echo360, Microsoft Teams, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used.

Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Online Proctoring

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the *Code of Student Rights & Responsibilities* (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online.**

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx, Echo360, Microsoft Teams or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

Academic Accommodation of Students with Disabilities

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's *Academic Accommodation of Students with Disabilities* policy.

Academic Accommodation for Religious, Indigenous or Spiritual Observances (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

Copyright and Recording

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical, and artistic work, **including lectures** by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

Extreme Circumstances

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.