

MICR302: MOLECULAR MICROBIOLOGY **COURSE OUTLINE SUMMER 2021**

INSTRUCTOR

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OFFICE HOURS

Thursdays, 10:30-11:30

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals for all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expression, national origins, religious affiliations, sexual orientations, ability-and other visible and nonvisible differences.

All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class.

COURSE OBJECTIVES

This course provides students with the tools to: i) recognize relationships between DNA, RNA and protein; ii) evaluate the contributions of different molecular mechanisms that microbes utilize to respond to environmental changes; and iii) apply this information in addressing diverse experimental questions.

Students will be able to:

- compare microbial signaling strategies
- provide examples of how the microbiome contributes to human health
- critically analyse and interpret primary scientific literature
- discuss the life cycle and applications of the budding yeast *S. cerevisiae*, a model eukaryotic organism
- design molecular and genetic experiments in the budding yeast system
- describe systems-biology approaches and explain how they are revolutionizing research in molecular biology

By the end of the course, each student will be capable of examining a biological response, hypothesizing which underlying genetic and/or biochemical process defines the response, and designing experiments to test the proposed hypothesis.

TEXTBOOK

There is no set textbook. Lecture notes and papers will be posted on Brightspace. A general microbiology textbook can be utilized for supplemental review, but is not essential.

COURSE FORMAT

This course is a blend of synchronous and asynchronous components. Lectures and synchronous sessions will be recorded and posted on BrightSpace.

A. Asynchronous; independent review of lecture material: Monday, Tuesday, 8:30-10:20, Thursday 8:30-9:20:

- Students are expected to review the posted lecture material during this time.
- Lecture material will be posted by or before the Monday of each week
- Notes are arranged by topic, and a single topic may span multiple lectures.

-Lectures will consist of recorded Powerpoint presentations, videos, and verbal descriptions of material.

-Not all material will be written down in the notes; some points will be highlighted in a verbal manner: students are responsible for synthesizing all materials covered in the course presentations.

B. Synchronous class: Thursday, 9:20-10:20*

-Via Zoom** (link to be posted on BrightSpace)

-This class is dedicated to reviewing the topics covered in the posted lecture material, discussing questions, and addressing problem/exercise sets.

**If more time is required, the class may start earlier: TBA*

***Students MUST sign into the Zoom link via their UVIC ID in order to access the sessions*

COURSE CONTENT

Topic	Components*
1. Introduction	-Overview of microbes, impacts and applications
2. DNA -DNA structure, expression	-Bacterial gene architecture, σ factors, comparison between prokaryotic and eukaryotic systems
3. RNA - RNA structure and regulation - CRISPR	-mRNA stability -riboswitches -RNA silencing in prokaryotes, gene editing
4. Protein - Two component systems - Translational surveillance	-Introduction to prokaryotic protein signaling, applications -Identification and destruction of aberrant proteins in prokaryotes
5. Responses to environment	-Heat shock -Stationary phase -Stringent response
6. Microbiome	-Impact of the microbiome on human health
7. Bacterial Signaling	-Quorum sensing, biofilms
8. <i>S. cerevisiae</i> budding yeast: a model eukaryote	-Lifecycle, examples of conserved signal transduction pathways -Advanced molecular, genetic and proteomic techniques
9. Systems, Synthetic Biology	-Budding yeast applications: high-throughput genomic and proteomic interrogation of biology

**Tentative*

ASSESSMENT OF STUDENT PERFORMANCE

(1) Techniques to be used:

- Assignment of a numerical mark to multiple choice, short and longer answer questions on exams, quizzes

- Exams, quizzes based on material covered in lectures (asynchronous and synchronous)

- Exams, quizzes are completed on BrightSpace and are “open-book”, but students are expected to study as if they were writing in class in order to complete the exams within the designated time frame. Students are obligated to write the exam on their own, without the assistance of others or the internet.

- Exams can be initiated within a 24 h time block, and completed within a restricted amount of time after initiation (Midterms 120 min; Quizzes 60 min).

(2) Evaluation and weighting:

Component	Date	Contribution
Midterm I	May 31	30%
Midterm II	June 24	40%
Quizzes:	May 20 May 27 June 10 June 17	30% (7.5 % each)

Anticipated Workload: @ 14-15 h/week (condensed course)

-includes class time, reviewing material, completing exercises, writing exams

(3) Grading Scheme:

A⁺	90 -100	B⁺	77 - 79	C⁺	65 - 69	F	< 50
A	85 - 89	B	73 - 76	C	60 - 64	N*	< 50
A⁻	80 - 84	B⁻	70 - 72	D	50 - 59		

* N grades

Students who have completed the following elements will be considered to have completed the course and will be assigned a final grade: Midterm 1, Midterm 2, at least 3 quizzes.

Failure to complete one or more of these elements will result in a grade of "N" regardless of the cumulative percentage on other elements of the course. An N is a failing grade, and it factors into a student's GPA as 0. The maximum percentage that can accompany an N on a student's transcript is 49.

Students are responsible for ensuring that they are properly registered in the course, and are expected to have met all pre/co-requisites for the course.

DEPARTMENT INFORMATION AND POLICIES

1. The Department of Biochemistry and Microbiology upholds and enforces the University's policies on academic integrity. These policies are described in the current University Calendar. All students are advised to read this section.
2. Cell phones, computers, and other electronic devices must be turned off at all times during live class sessions unless being used for the purpose of connecting and engaging with the class.
3. No recordings of live lectures are permitted without permission of the instructor. Many online courses will be recorded by the instructor for accessibility for students unable to attend. If you do not wish to be recorded, contact your instructor to determine if alternative arrangements can be made.
4. Course materials, such as notes, problem sheets, quizzes, examinations, example sheets, or review sheets, may not be redistributed without the explicit written permission of the instructor.
5. Students are expected to be available for all exams. Instructors may grant deferrals for midterm examinations for illness, accident, or family affliction. Although students do not require documentation, students must contact their instructor and BCMB office (biocmicr@uvic.ca) with the reason for their absence within 48 hours after the midterm exam. The Department will keep a record of the absences. It is the responsibility of the student to ensure all required components are complete, and to arrange deferred exams/assignments with the instructor, which normally should occur within one week of the original exam date.

6. The Department of Biochemistry and Microbiology considers it a breach of academic integrity for a student taking a deferred examination to discuss the exam with classmates. Similarly, students who reveal the contents of an examination to students taking an examination are considered to be in violation of the University of Victoria policy on academic integrity (see current University Calendar). Students must abide by UVic academic regulations and observe standards of scholarly integrity (no plagiarism or cheating). Online exams must be taken individually and not with a friend, classmate, or group, nor can you access notes, course materials, the internet, or other resources without the permission of the instructor. You are prohibited from sharing any information about the exam with others. Use of unauthorized electronic devices and accessing the internet and class material during exams is prohibited unless permission is granted by the instructor. Instructors may use Browser Lockdown Software to block access during classes and exams.
7. Deferral of a final exam must be requested with an Academic Concession form and submitted directly to Undergraduate Records. Deferred final exams for fall term courses will be arranged by the instructor. Deferred final exams for spring term courses will be arranged through Undergraduate Records and must be written before the end of the summer term as stipulated in the University Calendar.
8. Requests for review/remark of a midterm exam must be made within one week of the exam being returned.
9. The instructor reserves the right to use plagiarism detection software or other platforms to assess the integrity of student work.
10. Supplemental exams or assignments will not be offered to students wishing to upgrade their final mark.
11. Anonymous participation in online classes is not permitted without permission of the instructor.

IMPORTANT NOTE ABOUT COVID-RELATED STRESS

The current pandemic is placing added stressors- financial, mental, and physical- on everyone. Your well-being is of foremost importance. If you are experiencing difficulties coping, the University has resources to help. Reach out to Counselling Services, the Centre for Academic Communication, or Learning Assistance Program for assistance.

CENTRE FOR ACCESSIBLE LEARNING

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, approach the Centre for Accessible Learning (CAL) as soon as possible in order to assess your specific needs.

<https://www.uvic.ca/services/cal/index.php>

COURSE EXPERIENCE SURVEY (CES)

We value your feedback on this course. Towards the end of term you will have the opportunity to complete a confidential course experience survey (CES) regarding your learning experience. The survey is vital to providing feedback to us regarding the course and our teaching, as well as to help the department improve the overall program for students in the future. When it is time for you to complete the survey, you will receive an email inviting you to do so. If you do not receive an email invitation, you can go directly to your [CES dashboard](#). You will need to use your UVic NetLink ID to access the survey, which can be done on your laptop, tablet or mobile device. We will remind you nearer the time but please be thinking about this important activity.