MICR302
Molecular Microbiology
CRN 31267
Summer 2016

Class time/location: Mon, Wed, Thurs, 10:30 – 12:20, MacLaurin D110

Instructor: Dr. Doug Briant
Office hours: TBA
Room:Petch 227
e-mail: dbriant@uvic.ca
Instructor: Dr. Chris Nelson
Office hours: TBA
Room: Petch 270
e-mail: cjn@uvic.ca

Textbook: Since the course material is as up-to-date as possible, there is no course textbook. Much of the source material (papers) will be provided on-line in the CourseSpaces site, and will serve as an additional resource. You will need your UVic NetLink ID and password to access this information.

It is, however, recommended that you have easy access to a standard microbiology textbook.

Lecture Notes: Notes will generally be made available on the CourseSpaces site prior to lectures. Notes are arranged by topic, and a single topic may span multiple lectures. ***Lecture notes are not complete***, and students will be responsible for all materials covered in the lectures.

MICR302 course learning objectives:

- In this course, you will gain the tools to recognize relationships between DNA, RNA and protein. Applying these tools, you will be able to evaluate the specific contributions of different molecular mechanisms microbes utilize to respond to environmental changes.
- You will have the ability to compare microbial communication and signalling strategies.
- You will understand the importance of the microbiome in maintaining human health.
- You will be able to give examples of eukaryotic microbial pathogens and their modes of infection.
- You will be able to discuss the utility of budding yeast a model eukaryotic system, and discuss several systems biology approaches that are revolutionizing research in molecular biology

By the end of the course, it is expected that each student will be capable of examining a biological response and hypothesizing which underlying genetic and/or biochemical process defines the response. Students will then be able to design experiments, including all relevant controls, to test their proposed hypothesis.

Important dates and evaluation:

EVALUATION	Date
5% DJB assignment 1	***in class, group submission*** Monday, July 11
5% DJB assignment 2	***individual, hard copy due at start of class*** Monday,July 25
20% DJB test 1	***1 hour, in class*** Thursday, July 14
35% cumulative exam all DJB material	***1 hour, 45 min – in class*** Thursday, July 28
5% CJN assignment 3	***in class, group submission*** Monday, August 08
5% CJN assignment 4t	***individual, hard copy due at start of class*** Monday,August 15
25% CJN exam	***1 hour, 45 min - in class*** Thursday, August 18

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- Students are responsible for ensuring that they are properly registered in the course.
- Students are expected to have met all pre/co-requisites for the course (see above).

Grading:

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:

- ***All three exams must be completed to complete the course***

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

Tentative Class Schedule:

	topic	***comments***
1	***Introduction***	
2	***DNA***	
	a) gene structure and expression	bacterial gene architecture, σ factors, comparison between prokaryotic and eukaryotic systems
3	***RNA***	
	a) structure and regulation	mRNA stability, riboswitches
	b) CRISPR	RNA silencing in prokaryotes, gene editing
4	***Protein***	
	a) two component systems	introduction to prokaryotic protein signalling
	b) protein splicing	inteins and exteins, applications
	c) translational surveillance	identification and destruction of aberrant proteins in prokaryotes
5	***Environment***	
	a) heat shock	role of sigma factors, chaperones and proteases
	b) envelope stress	antisigma factors
	c) stationary phase	rpoS, σ^S
	d) stringent response	response to stringent conditions, including σ and ppGpp
	e) sporulation	role of phosphorylation and sigma factors
6	***Bacterial Signalling***	
	a) environmental and community	chemotaxis and two component systems, quorum sensing and bacterial communication, importance of biofilms
7	***Microbiome***	how does the microbiome impact human health?
8	***Fungal microbes of medical and industrial importance***	a survey of important fungal species that impact human health and disease.
9	***Budding yeast: a model eukaryote***	lifecycle, examples of conserved signal transduction pathways, advanced molecular, genetic and proteomic techniques.
10	***Systems and synthetic biology***	how budding yeast tools enable high-throughput genomic and proteomic interrogation of biology

DEPARTMENT INFORMATION AND POLICIES

1. The Department of Biochemistry and Microbiology upholds and enforces the University's policies on plagiarism and cheating. 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 unless being used for a purpose relevant to the class. Students having a cell phone, tablet, or computer on their person during an exam will be assumed to have it for the purpose of cheating.

3. Any recordings of lectures may only be performed with written permission of the instructor, and are for personal use only. The instructor retains copyright to such recordings and all lecture materials provided for the class (electronic and otherwise); these materials must not be shared or reposted on the Internet.

4. Students are expected to be present for the midterm and final exams. Instructors may grant deferrals for midterm examinations for illness, accident, or family affliction, and students must provide appropriate documentation 48 hours after the midterm exam. The deferred exam must be written within five business days of the original exam. 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 a deferred examination are considered to be in violation of the University of Victoria policy on academic integrity (see current University Calendar). 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.

5. Scan sheets for multiple choice exams (bubble sheets) will not be made available for review. Therefore, in addition to filling in answers on the scan sheet, students should also circle their answers in ink on their exam.

6. Professors may refuse to review/remark exams not written in ink. In addition, requests for review/remark of a midterm exam must be made within one week of the exam being returned. Students are expected to promptly pick up midterm exams after marking has been completed, either in class or from the instructor.

7. Examination papers that have pages removed, or are mutilated will not be marked.