



## COURSE OUTLINE

### 1. **Course:** CMMB 411, Molecular Genetics - Fall 2021

Lecture 01: MWF 15:00 - 15:50 - Online

Instructor	Email	Phone	Office	Hours
Dr Steven Zimmerly	zimmerly@ucalgary.ca	403 220-7933	BI 319C	TBA

#### Online Delivery Details:

Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

This course has a registrar scheduled, synchronous final exam. The writing time is 2 hours + 50% buffer time.

Lectures will be delivered online during scheduled class times. Recordings of lectures will also be available on D2L.

Quizzes will be held synchronously via D2L during scheduled class periods on Wednesdays of most weeks.

The midterm exam will be held asynchronously through D2L within a defined 24 hour window of time.

#### Course Site:

D2L: CMMB 411 L01-(Fall 2021)-Molecular Genetics

**Note:** Students must use their U of C account for all course correspondence.

### 2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

#### Prerequisite(s):

Biology 311 or Medical Science 341; and Biology 331 or Medical Science 351; and Biochemistry 341 or 393.

### 3. **Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Component(s)	Weighting %	Date
Quizzes (eight of ten best quiz scores, 5% each)	40	Specified Wednesdays
Midterm exam	20	Oct. 29 2021 (Friday)
Final exam	40	TBA

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	87 %	84%	81%	78 %	75 %	72%	69%	66 %	60 %

There will be ten quizzes conducted via D2L on specified Wednesdays, each of which should take approximately 15 minutes to complete. Each quiz will cover only material from the previous week's lectures (MWF) unless noted otherwise. Dates for the quizzes will be Sept. 15, 22, 29, Oct. 6, 13, 20, 27, Nov. 3, 10, 17, 24 and Dec. 1. For these class sessions there will be no lecture; instead the corresponding lecture will be posted on D2L.

The midterm exam will be held on October 29, and will be available on D2L from 8:00 AM October 29 (Friday) to 8:00 AM October 29 (Saturday).

A synchronous two-hour final exam will be scheduled by the registrar's office. Students will have three hours to complete the exam to account for any issues. Time will be adjusted for SAS students if needed, and accommodations for students will be done on a case-by-case basis.

This course will have a final exam that will be scheduled by the Registrar. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

The final exam will be administered using an on-line platform. Per section [G.5](#) of the online Academic Calendar, timed final exams administered using an on-line platform, such as D2L, will be available on the platform. Due to the scheduling of the final exams, the additional time will be added to **the end** of the registrar scheduled **synchronous** exam to support students. This way, your exam schedule accurately reflects the **start time** of the exam for any **synchronous** exams. E.g. If a **synchronous** exam is designed for 2 hours and the final exam is scheduled from 9-11am in your student centre, the additional time will be added to the **end** time of the **synchronous** exam. This means that if the exam has a 1 hour buffer time, a synchronous exam would start at 9 am and finish at 12pm.

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

#### 4. **Missed Components Of Term Work:**

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

There will be no make-up quizzes; however, students may miss two quizzes during the term, because only the eight best quiz scores will be included in the final grade calculation. Students who will miss more than two quizzes due to exceptional circumstances such as an extended illness should contact the instructor.

#### 5. **Scheduled Out-of-Class Activities:**

There are no scheduled out of class activities for this course.

#### 6. **Course Materials:**

Required Textbook(s):

Watson, Baker, Bell, Gann, Levine, Losick, *Molecular Biology of the Gene, 7th edition* : Pearson.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;

- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

#### 7. **Examination Policy:**

No calculators are required for quizzes or exams. During online assessments, students are permitted to access textbooks and notes, but are not permitted to use other resources or to communicate with others.

Students should also read the Calendar, [Section G](#), on Examinations.

#### 8. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

#### 9. **Writing Across The Curriculum Statement:**

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

#### 10. **Human & Living Organism Studies Statements:**

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

**STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS.** Students taking laboratory and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

Students are expected to be familiar with [Section SC.4.1](#) of the University Calendar.

#### 11. **Reappraisal Of Grades:**

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

#### 12. **Other Important Information For Students:**

- Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus

Mental Health Strategy website ([Mental Health](#)).

- b. **SU Wellness Services:** For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([syva@ucalgary.ca](mailto:syva@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>)
- d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)  
Student Academic Misconduct [Policy](#) and [Procedure](#)  
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

e. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Lisa Gieg by email [imgieg@ucalgary.ca](mailto:imgieg@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

- f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- g. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). [Student Ombudsman](#), Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca).
- h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

## **Course Topics for CMMB 411 & Approximate Schedule**

### 1. DNA (Chapter 4; Sept. 10)

DNA structure, topology and topoisomerases

### 2. Genomes, Chromosomes and Nucleosomes (Ch. 8; Sept. 13-20)

Characteristics of genomes and chromosomes. Structure of chromatin and nucleosomes. Consequences of chromatin on DNA replication and transcription.

### 3. DNA Replication (Ch. 9; Sept. 22-29)

DNA polymerases, primase, sliding clamp and clamp loader, replication fork, origins of replication. The replication process in prokaryotes and eukaryotes including telomeres and telomerase.

### 4. DNA Damage, Mutagenesis and Repair Mechanisms (Ch. 10; Oct.1-4)

Types of DNA damage and mutations. Mechanisms of repair including base excision repair, nucleotide excision repair, transcription-coupled repair, recombination-based repair and error-prone repair.

### 5. Recombination (Ch. 11, 12; Oct. 6-8)

Homologous and nonhomologous recombination.

### 6. Transcription and Regulation in Prokaryotes (Ch. 13, 18; Oct. 13-27)

RNA polymerases, structural features of promoters and terminators, prokaryotic transcription process. Operons, regulatory proteins and mechanisms.

### 7. Transcription and Regulation in Eukaryotes (Ch. 13, 19; Oct. 29-Nov. 15)

RNA polymerases I, II and III. The machinery and mechanisms of eukaryotic transcription. Eukaryotic regulatory factors and families. Enhancers and regulation through chromatin structure and silencing.

### 8. Translation (Ch. 15, 16; Nov. 17-24)

Structural and functional features of mRNA, tRNA and ribosome. Steps of translation, including initiation, and termination. Regulation.

### 9. RNA Structure, Intron Splicing and Post-Transcriptional Processes (Ch. 5, 14; Nov. 26-Dec. 3)

Features of RNA structure and self-splicing introns. The eukaryotic nuclear splicing pathway, its mechanism and regulation. Alternative splicing, the minor spliceosome, RNA editing.

### 10. Regulatory RNA (Ch. 20; Dec. 6-8)

RNAi, CRISPR-Cas, riboswitches and regulatory RNAs in bacteria and eukaryotes.

## **Course Outcomes:**

- Be able to describe structural and functional features of DNA and RNA and how these features are suited to their roles in the cell, in contrast to proteins
- Be able to describe the organization of genomes in prokaryotes and eukaryotes and how DNA is packaged
- Be able to explain in detail the central biological processes of DNA replication, recombination and repair, transcription, translation and splicing
- Be able to explain mechanisms of positive and negative regulation of gene expression in prokaryotes and eukaryotes, including transcriptional and post-transcriptional mechanisms
- Understand the logic of pathways (such as replication, transcription, translation) such that the student can infer the consequences if a pathway is perturbed by an altered step or defective enzyme
- Be able to recognize and describe commonalities and differences in the central molecular genetic processes in prokaryotes versus eukaryotes, including in replication, transcription, and translation

Electronically Approved - Sep 08 2021 05:34

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## **Department Approval**