



UNIVERSITY OF CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES COURSE OUTLINE

1. Course: **CMMB 411 - Molecular Genetics**

Lecture Section(s)	L01	MWF	15:00	ST141	Fall 2017
Instructor(s):	Dr. S.-L. Wong (Coordinator)		BI 178A	220-5721	slwong@ucalgary.ca
	Dr. S. Zimmerly		BI 319C	220-7933	zimmerly@ucalgary.ca

Desire 2 Learn (D2L) website for this course is CMMB 411 L01 - (Fall 2017) - Molecular Genetics

Biological Sciences Department BI 186 403-220-3140 biosci@ucalgary.ca

2. Prerequisites: **One of Biology 311 or Medical Sciences 341; and one of Biology 331 or Medical Sciences 351; and one of Biochemistry 341 or Biochemistry 393.**

See section 3.5.C in the Faculty of Science section of the online Calendar
www.ucalgary.ca/pubs/calendar/current/sc-3-5.html

NOTE: Prior completion of or concurrent registration in Biochemistry 401 or Biochemistry 443 is strongly recommended.

The use of "Mastering Biology" provided by the textbook publisher is strongly recommended.

3. Grading: The University policy on grading and related matters is described sections [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

In-class quiz 1	10%	(October 2, 2017)	
Midterm Exam	40 %	(November 4, 2017)	Location: ST 140
In-class quiz 2	10 %	(November 22, 2017)	
Final Exam	40 %	(There will be a final exam scheduled by the Registrar's office.)	

Students must achieve a passing grade (minimum of D) on the lecture portion of the course (average of the quizzes, midterm and final exams) to qualify for a passing grade overall.

Each piece of work (quiz, midterm test and final examination) submitted by the student will be assigned a percentage score. The student's average percentage score for the various components 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.

Final Grade Scale :

A+ : 93 or higher
A : 88 and under 93
A- : 83 and under 88
B+ : 78 and under 83
B : 73 and under 78
B- : 68 and under 73
C+ : 64 and under 68
C : 60 and under 64
C- : 56 and under 60
D+ : 52 and under 56
D : 48 and under 52
F : <48

4. Missed Components of Term Work: The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.3](#) of the University Calendar

5. **Scheduled out-of-class activities:** Dates and times of approved class activities held outside of class hours.

Midterm: Saturday, November 4, 2017; 14:00-17:00 ST 140

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

6. **Course Materials:** Required: Molecular Biology of the Gene, Watson, Pearson Education Canada, 7th Edition.

7. **Examination Policy:** No electronic or written aids (e.g. cell phones, tablets, computers, PDAs, notes, textbooks) will be allowed during writing of any exams. Non-programmable calculators will be permitted to answer quantitative questions on exams, if applicable, and permission to do this will be clearly indicated on the examination paper. Students should also read the Calendar, [Section G](#), on Examinations.

8. In this course, the quality of the student's writing will be a factor in the evaluation of the written answers in the exams. See also [Section E.2](#) of the University Calendar.

9. OTHER IMPORTANT INFORMATION FOR STUDENTS:

(a) **Academic Misconduct:** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties

(b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).

(c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students *with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.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, preferably in writing, to the Associate Head of Biological Sciences, Dr. H. Addy by email addy@ucalgary.ca or phone 403 220-3140.

(d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

(e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, 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 also <http://www.ucalgary.ca/secretariat/privacy>.

(f) **Student Union Information:** VP Academic Phone: 403 220-3911 Email: suvpaca@ucalgary.ca
SU Faculty Rep. Phone: 403 220-3913 Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca;
Student Ombuds Office: 403 220-6420 Email: ombuds@ucalgary.ca; <http://ucalgary.ca/provost/students/ombuds>

(g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

(h) At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

(i) **Regrading of Quizzes and the Midterm Exam**

A student who is not satisfied with the grading of the quizzes and the midterm exam should contact the corresponding instructor for reappraisal. This MUST be done within **15** days of the quiz/exam answer booklet being returned to the student. Refer to the University of Calgary calendar for further information.

Department Approval _____ ORIGINAL SIGNED _____ Date _____

Associate Dean's Approval for
out of regular class-time activity: _____ ORIGINAL SIGNED _____ Date: _____
C411 F17; 8/15/2017 11:36 AM

COURSE OUTLINE CMMB 411

1. DNA (SLW)
DNA topology and topoisomerases
(7th edition: Chapter 4, pp 77-89, pp 92-105; Chapter 9, pp 303; 6th edition: Chapter 6, pp 117-127).
2. Prokaryotic DNA Replication (SLW)
DNA polymerases, primase, sliding clamp and clamp loader, replication fork, origins of replication and replication process.
(7th edition: Chapter 9, pp 257-296; Chapter 10, pp 320; 6th edition: Chapter 8, pp 195-239)
3. Prokaryotic Mechanisms of Transcription (SLW)
RNA polymerases, structural features of promoters and terminators, prokaryotic transcription process.
(7th edition: Chapter 13, pp 429-447; 6th edition: Chapter 12, pp 377-397)
4. Gene regulation in Prokaryotes (SLW)
Regulatory proteins, regulatory mechanisms at transcription initiation, elongation and termination.
(7th edition: Chapter 18, pp 615-631, 634; 6th edition: Chapter 16, pp 547-567)
5. Translation (SLW)
Structural and functional features of mRNA and tRNA, amino acid charging, codon recognition and decoding, structure of ribosome, translation process (initiation, elongation, mRNA translocation and termination).
(7th edition: Chapters 15, pp509-549, Chapter 16; 6th edition: Chapters 14-15)
6. Molecular mechanism of recombination (SLW)
Inter-strand and double strand breaks. Models for homologous recombination. Genes and enzymes involved in homologous recombination.
(7th edition: Chapter 11, pp341-366; 6th edition: Chapter 10, pp 284-303, Chapter 11, pp 319-334)
7. DNA Damage, Mutagenesis and Repair Mechanisms (Chapter 10) (SZ)
Types of DNA damage. Spontaneous and induced mutations. Mechanisms of DNA repair including base excision and nucleotide excision repair, transcription-coupled repair and recombination-based repair. Error-prone repair and mutagenesis.
8. DNA Sequencing and Genomics (Chapter 7) (SZ)
Basics of DNA sequencing technology and genome assembly.
9. Eukaryotic Chromosomes and Nucleosomes (Chapter 8) (SZ)
Eukaryotic genome and chromosome structure. Chromatin, nucleosomes and their effect on transcription.
10. Eukaryotic DNA Replication and Telomeres (Chapter 8) (SZ)
Chromosome duplication and segregation. Centromeres. Structure and function of telomeres. Mechanism of DNA replication. Replication of telomeres and telomerase.
11. Mechanisms of Eukaryotic Transcription (Chapter 13) (SZ)
RNA polymerases I, II and III, the basic transcriptional machinery and transcription factors.
12. Gene Regulation in Eukaryotes (Chapters 19) (SZ)
Regulatory transcription factors and families, enhancers, signal transduction pathways, silencing.
13. RNA Structure, Intron Splicing and Post-Transcriptional Processes (Chapters 5, 14) (SZ)
The splicing pathway and mechanism. Alternative splicing. Self-splicing introns. RNA editing.
14. Regulatory RNAs (Chapter 20) (SZ)
RNAi, CRISPR-Cas, riboswitches and regulatory RNAs in bacteria and eukaryotes.