GENETICS 270: FOUNDATIONS OF MOLECULAR GENETICS - Winter 2018

COURSE DESCRIPTION: Basic concepts on the organization of genetic material and its expression will be developed from experiments on bacteria and viruses.

PLACE & TIME:

LEC B1	52049	T	R	11:00-12:20	CCIS L2 200
SEM J1	Auto		R	15:30-16:50	TL B 2

INSTRUCTOR:

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TEXTBOOK

The textbook, Molecular Genetics of Bacteria, 4th Edition, by Larry Snyder and Wendy Champness, will greatly assist you in your understanding of the lecture material. The 4th Edition textbook is available online for free through the university, and also through the bookstore, and this is the textbook we will follow. You will be tested on all of the topics covered in class, and most of this material will be supported by material in the suggested chapter readings. To access the online textbook, go to UofA "Libraries" web site, "Search" title of book, select Snyder, 4th ed., click on University of Alberta access, and enter your CCID name & password to access content, or go here:
http://site.ebrary.com.login.ezproxy.library.ualberta.ca/lib/ualberta/reader.action?docID=10883090

PAPERS

You will be responsible for original research papers (available on the GENET 270 website) that have been compiled for Genetics 270. These papers will be covered in seminar sessions and in quizzes.

WEB SITE

Lecture and seminar notes will be posted on the e-class Genetics 270 website.

BOOKS ON RESERVE

Other helpful reference materials for Genetics 270 will be kept on reserve in the John W. Scott Health Sciences Library (Walter C. Mackenzie Health Centre, 2nd floor).

PREREQUISITES:

- Biology 207
- you are responsible for ensuring that you have the prerequisite(s) and that you are properly registered for this class (i.e. your name is on the official class list on Beartracks)

MARKING BREAKDOWN

Midterm Exam I	25%	1st term material only
Midterm Exam II	25%	2st term material only
Final exam	30%	cumulative, with emphasis on 3rd term
Quizzes	20%	(e.g. 4 x 5%)

FINAL GRADE ASSESSMENT
Grades are assigned according to specifications in the University Calendar (Section 23.4.4). Final grades will be based on a combination of class mark distribution and absolute marks. The absolute percentage scores to secure a particular grade will vary from year to year because it is not possible to write exams with consistently identical difficulty levels. Grades in any course, examination or other academic assessment shall not be mandated on the basis of a curve or historic distribution of student grades. Where possible, the instructor will use natural breaks in the grade distribution to set final grade boundaries.

EXAMS
- exams will cover material from lectures, assigned readings, and occasionally seminars.
- they will consist of some combination of multiple choice, fill in the blank, matching, short and long answer questions
- they will require both memory and problem solving

DEFERRED EXAMS
Midterms
For a student with an absence due to an incapacitating illness for a missed midterm exam, the weight of the exam will be transferred to the final exam.

Final exam
A student who has missed a final examination because of illness or domestic affliction or who is obliged to be absent from a final examination for some other compelling reason (including religious convictions) may apply for a deferred final examination. To do this, students must go to the Faculty of Science Office with a medical statement from University Health Services (Doctor's note, statutory declaration, or other appropriate documentation). This must be done within 2 working days of the missed exam. The date for the deferred final examination in Genetics 270 will be in May 2018, time and place to be announced. Students should contact the instructor or the Dept. of Biological Sciences office (492-3247) 48 hours prior to the deferred exam to confirm date, time, and location in case there should be any last minute changes.

SEMINARS & QUIZZES
During seminars, a paper of significance related to the course material will be discussed. Quizzes directly related to material covered in seminars will be given as indicated.

**** there will be no deferrals for quizzes or the midterm exams***

**** in the absence of official documentation, a grade of 0 will be assigned for missed quizzes; otherwise the weight will be transferred to the final exam.***

LECTURE SCHEDULE

Lec	Date	Topic	Readings (4th edition)	Seminar
		Organization of Microbial	**Genetic Material**	
1	Tues. Jan. 9	Bacteria & Phage	Introduction	
2	Thurs. Jan. 11	Bacterial Chromosomes	Chapter 1	Introduction
3	Tues. Jan. 16	Bacterial Chromosomes	Chapter 1	
4	Thurs. Jan. 18	Plasmids	Chapter 4	Sem. 1
5	Tues. Jan. 23	Plasmids	Chapter 4	
6	Thurs. Jan. 25	Bacteriophages	Chapter 7 & 8	Sem. 2
7	Tues. Jan. 30	Bacteriophages	Chapter 7 & 8	
		Bacterial Genome Evolution		
8	Thurs. Feb. 1	Conjugation	Chapter 5	Quiz 1 / Help Session
	Tues. Feb. 6	MIDTERM I		
9	Thurs. Feb. 8	Transformation	Chapter 6	Sem. 3
10	Tues. Feb. 13	Transduction	Chapter 7 & 8	
11	Thurs. Feb. 15	Transposition	Chapter 9	Sem. 4
	Tues. Feb. 20	Winter Term Reading Week		
	Thurs. Feb. 22	Winter Term Reading Week		
12	Tues. Feb. 27	Recombination	Chapter 10	
13	Thurs. Mar. 1	Recombination	Chapter 10	Quiz 2 / Sem. 5
14	Tues. Mar. 6	Mutation	Chapter 3 &11	
15	Thurs. Mar. 8	Mutation	Chapter 3 &11	Sem. 6
16	Tues. Mar. 13	DNA Repair	Chapter 11	
17	Thurs. Mar. 15	DNA Repair	Chapter 11	Quiz 3 / Help Session
	Tues. Mar. 20	MIDTERM II		
		Bacterial Gene Expression		
18	Thurs. Mar. 22	Transcription	Chapter 2	Sem. 7
19	Tues. Mar. 27	Translation	Chapter 2	
20	Thurs. Mar. 29	Gene Regulation	Chapter 12	Sem. 8
21	Tues. Apr. 3	Gene Regulation	Chapter 12	
22	Thurs. Apr. 5	Global Gene Regulation	Chapter 13	Quiz 4 / Sem. 9*
23	Tues. Apr. 10	Lambda Gene Regulation	Lecture Notes	
24	Thurs. Apr. 12	Lambda Gene Regulation	Lecture Notes	Help Session
		Final Exam – TBD		

*Material from final seminar will be tested on the final exam.

SEMINAR READINGS

SEMINAR	DATE	PAPER
	Thurs. Jan 11	Introduction
1	Thurs. Jan. 18	Barr et al. Bacteriophage adhering to mucus provide a non-host-derived immunity. 2013. *Proc Natl Acad Sci USA* **110**: 10771-6.
2	Thurs. Jan. 25	Gibson et al. Creation of a bacterial cell controlled by a chemically synthesized genome. 2010. *Science* **329**:52-56.
	Thurs. Feb. 1	**Quiz 1.** **Help Session.**
3	Thurs. Feb. 8	Vogel et al. 1998. Conjugative transfer by the virulence system of *Legionella pneumophila. Science* **279**:873-876.
4	Thurs. Feb. 15	Seifert et al. 1988. DNA transformation leads to pilin antigenic variation in *Neisseria gonorrhoeae. Nature* **336**:392-395.
	Thurs. Feb. 22	**Winter Term Reading Week**
5	Thurs. Mar. 1	**Quiz 2.** Shousha et al. 2015. Bacteriophages isolated from chicken meat and the horizontal transfer of antimicrobial resistance genes. *Appl. Environ. Microbiol.* **81**:4600-4606.
6	Thurs. Mar. 8	Datsenko and Wanner. 2000. One-step inactivation of chromosomal genes in *Escherichia coli* K-12 using PCR products. *Proc Natl Acad Sci USA* **97**:6640-6645.
	Thurs. Mar. 15	**Quiz 3.** **Help Session.**
7	Thurs. Mar. 22	Waldor & Mekalanos. 1996. Lysogenic conversion by a filamentous phage encoding cholera toxin. *Science* **272**:1910-4.
8	Thurs. Mar. 29	Browning & Busby. 2004. The regulation of bacterial transcription initiation. *Nat Rev Microbiol* **2**:1-9.
9*	Thurs. Apr. 5	**Quiz 4.** Lynch KH, Seed KD, Stothard P, Dennis JJ. 2010. Inactivation of *Burkholderia cepacia* complex phage KS9 gp41 identifies the phage repressor and generates lytic virions. *J Virol.* **84**:1276-88.
	Thurs. Apr. 12	**Help Session.**

*Material from the final seminar will be tested on the final exam.

PLAGIARISM AND CHEATING

Plagiarism and cheating are treated very seriously by the University of Alberta and may be penalized by: expulsion, suspension, fine, mark reduction, a grade of F, conduct probation, a written reprimand, or suspension of a degree already awarded.

Plagiarism

No student shall submit the words, ideas, images, or data of another person as the student's own in any academic writing, essay, thesis, research project, or assignment in a course program of study.

Cheating

No student shall:

1) in the course of an examination, obtain or attempt to obtain information from another student or other unauthorized source or give or attempt to give information to another student, or knowingly possess, use or attempt to use any unauthorized material.
2) represent or attempt to represent oneself or have or attempt to have oneself represented by another in the taking of an examination, preparation of a paper or other similar activity.
3) Submit in any course or program of study, without the written approval of the course instructor, all or a substantial portion of any academic writing, essay, thesis, research report, project or assignment for which credit has previously been obtained by the student or which has been or is being submitted by the student in another course or program of study in the university elsewhere.

Submit in any course or program of study any academic writing, essay, thesis, research report, project or assignment containing a statement of fact known by the student to be false or a reference to a source which reference or source has been fabricated.

The UofA "Don't Cheatsheet" is available on the University Governance website at:
http://www.governance.ualberta.ca/
From the drop down menu click on *Student Appeals* and navigate to the Don't Cheatsheet.

Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behavior (online at www.ualberta.ca/secretariat/appeals.htm) and avoid any behavior, which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence.