University of Alberta
Biology 207 - Molecular Genetics & Heredity
Spring 2012 - Course Syllabus

Lectures  MTWRF, 10:30-11:40

Lecturer  Dr. Mike Harrington, mjh@ualberta.ca, BioSci B-109A, open door

General content
• How do genes control the cell?
• How are genes themselves controlled?
• What happens when genes are mutated?
• How are genes studied?

Course objectives
• To understand the major concepts and techniques of classical and molecular genetics.
• To develop problem solving skills.

Prerequisite  BIOL 107 or equivalent

Required texts
"Open Genetics" by Mike Deyholos

Website
www.biology.ualberta.ca/people/mike_harrington/biol207/b207main.htm
www.biology.ualberta.ca  >  Undergraduate courses  >  Biology  >  BIOL 207

Marks
Lab  35%  ---
Clickers  5%  ---
Midterm 1  10%  Friday, May 18, in class
Midterm 2  10%  Friday, June 1, in class
Final  40%  (tentatively) Thursday, June 14, 3:00 - 6:00

Laboratories  Attendance at all laboratory sections is required. In preparation for your first lab you must read Week 1 in the lab manual. Issues concerning lab attendance and lab assignments should be discussed with the Biology 207 Laboratory Coordinator: Mark Wolansky, BioSci CW-312, mark.wolansky@ualberta.ca.

Allergies  Consult with either the course instructor or the lab coordinator if you are allergic or suspect you might be allergic to any antibiotic (penicillin, ampicillin, etc.).
Clickers Students who answer 70% or more of the clicker questions will receive 5/5. A full description of how clicker marks will be assigned is available on the course website.

Exams The questions will be primarily problem solving rather than factual recall. To do well we recommend that you:
- participate during the clicker questions in class
- do the assigned readings and problems on a regular basis

Written English Students are expected to use University-level spelling, grammar, composition, and handwriting throughout the course.

Grading of the course The total numerical score will be converted to a grade on the University’s letter grading system. It is most likely that the grades will follow a normal distribution with a median mark of a B.

Recording lectures Audio recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan.

Academic support centre Students who require help in developing strategies for better time management, study skills or examination skills should contact the Academic Support Centre: www.uofaweb.ualberta.ca/academicsupport/

Specialized support and disability services (SSDS) Students who require accommodations in this course due to a disability affecting mobility, vision, hearing, learning, mental health, or physical health are advised and encouraged to discuss their needs with the SSDS: www.uofaweb.ualberta.ca/SSDS/


## Lecture topics

### Part A  Genes and mutations

1. Mitosis, meiosis, & life cycles
2. Chromosomes during the cell cycle
3. Human chromosomes
4. Genes & chromosomes
5. Genes encode proteins
6. Causes of gene mutation
7. Consequences of gene mutation
8. Usefulness of gene mutations

### Part B  Classical genetics

9. Mendel invents genetics
10. Classical genetics
11. Interactions between alleles of one gene
12. Sex chromosomes
13. Meiotic recombination
14. Mapping genes with meiotic recombination
15. Human pedigree analysis - part 1
16. Human pedigree analysis - part 2
17. Population genetics
18. Interactions between genes - part 1
19. Interactions between genes - part 2

### Part C  Molecular genetics

20. Restriction digests & gel electrophoresis
21. Recombinant DNA
22. PCR
23. DNA sequencing
24. Human genome project
25. Manipulating DNA
26. DNA fingerprinting

### Part D  Chromosomes and mutations

27. Changes in chromosome number
28. Changes in chromosome structure
29. Fluorescence in situ hybridization
30. The lac operon
## Weekly Summary of Projects and Due Dates of Graded Activities During Spring 2012

<table>
<thead>
<tr>
<th>Lab</th>
<th>Date of Lab</th>
<th>Project(s)</th>
<th>Graded Activities**</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Tuesday, May 8(^{th})</td>
<td>– lab orientation&lt;br&gt;2 – streak <em>E. coli</em> on plates*&lt;br&gt;3 – prepare master plates*&lt;br&gt;5 – inoculate yeast cultures*</td>
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<td>2</td>
<td>Thursday, May 10(^{th})</td>
<td>1a – study mitosis in onion&lt;br&gt;1b – study meiosis in rye&lt;br&gt;5 – titre yeast culture*&lt;br&gt;10 – introduce group presentation</td>
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<tr>
<td>3</td>
<td>Tuesday, May 15(^{th})</td>
<td>2 – results and analysis of BCP&lt;br&gt;3 – replica plate yeast strains*&lt;br&gt;4 – bioinformatics assignment</td>
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<tr>
<td>4</td>
<td>Thursday, May 17(^{th})</td>
<td>3 – results and analysis of complementation&lt;br&gt;5 – dilute, plate and UV-irradiate yeast*</td>
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<tr>
<td>5</td>
<td>Tuesday, May 22(^{nd})</td>
<td>5 – collect results and analyze&lt;br&gt;6 – collect results* and analyze</td>
<td>Bioinformatics Assignment due 3%</td>
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<tr>
<td>6</td>
<td>Thursday, May 24(^{th})</td>
<td>7 – problems in classical genetics</td>
<td>Outline for Group Presentation due</td>
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<tr>
<td>7</td>
<td>Tuesday, May 29(^{th})</td>
<td><strong>Open Labs</strong></td>
<td>Mutagenesis Lab Report due 7%</td>
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<tr>
<td>8</td>
<td>Thursday, May 31(^{st})</td>
<td>8 – ligation and transformation*</td>
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<tr>
<td>9</td>
<td>Tuesday, June 5(^{th})</td>
<td>8 – DNA extraction and digestions*&lt;br&gt;9 – DNA extraction and PCR</td>
<td>Simulator Assignment due 8%</td>
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<tr>
<td>10</td>
<td>Thursday, June 7(^{th})</td>
<td>8 – gel electrophoresis* and analyses&lt;br&gt;9 – gel electrophoresis and analyses</td>
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<tr>
<td>11</td>
<td>Tuesday, June 12(^{th})</td>
<td>10 – groups present their projects</td>
<td>Group Presentation due 7%</td>
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</table>

* Components of these activities contribute to your practical mark. (3%)
** Pre-lab quizzes are not listed. These quizzes are unscheduled, “pop” quizzes. (5%)
**Missing a midterm exam** A student who cannot write a midterm due to an incapacitating illness, severe domestic affliction, or other compelling reason can apply to have the weight transferred to the final exam. The student should contact the instructor as soon as is feasible (normally within two days). It is up to the discretion of the instructor whether the request will be accepted or denied. The student may be required to provide documentation to support their claim or to make a signed declaration before a Commissioner of Oaths in the Student Services Office.

**Missing the final exam** A student who cannot write the final examination due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for a deferred final examination. Such an application must be made to the student’s Faculty office within 48 hours of the missed examination and must be supported by a Statutory Declaration (in lieu of a medical statement form) or other appropriate documentation (Calendar section 23.5.6). Deferred examinations are a privilege and not a right; there is no guarantee that a deferred examination will be granted. Misrepresentation of Facts to gain a deferred examination is a serious breach of the Code of Student Behaviour. The deferred application will be approved or denied by the student’s faculty. The deferred lecture final exam will be held on Friday June 22, 9:00 AM, BioSci B-109A.

**Re-examinations** In certain circumstances a student who fails Biology 207 may be allowed to re-write a final exam. Consult sections 23.5.5 and 182.5.9 in the Calendar.

**Code of Student Behaviour** The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.ualberta.ca/secretariat/appeals.htm) and avoid any behaviour that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

Policy about course outlines can be found in section 23.4(2) of the University Calendar.