BIOL 441
Molecular Genetics

Fall Term (2014-15)

CALENDAR DESCRIPTION

Current research in molecular genetics including gene regulation, transformation, cell proliferation and the analysis of development. Specific topics will vary depending on the instructor but will include plant, insect and mammalian genetics.

PREREQUISITE BIOL 330/3.0 or BCHM 218/3.0 or *MBIO 218/3.0*.
EXCLUSION No more than 3.0 credits from BIOL 441/3.0; PATH 425/3.0.

SCHEDULE

Lectures: Monday 8:30-9:30, Tuesday 10:30-11:30, Thursday 9:30-10:30. BIOSCI 1120.
Tutorial sessions: Monday 2:30-3:30pm or Tuesday 2:30-3:30pm (see SOLUS for details).

Instructor	**Dr. V.K. Walker**
Instructor Contact	walkervk@queensu.ca; Phone: 613-533-6394
Office Hours	See posted on office door (2522)
TA:	Melissa Bredow
TA Contact Information	11mb95@queensu.ca
Office Hours	Mondays 3:30-6:00 (confirm with V. K. Walker)

Learning Objectives

The goals of Biology 441 are to allow students to develop confidence and sufficient breadth of knowledge to discuss and write about a wide range of controversial topics in the area of molecular genetics and epigenetics. Tutorial session topics vary broadly and range from synthetic biology to prions and interfering RNA, and from the ethics of GMO food aid to new forms of eugenics. Lectures provide sufficient background knowledge in molecular genetics so that self-directed learning on a topic of the students' choice can be achieved. A student's investigation will be of sufficient depth so that an oral presentation and a formal grant proposal can be developed. Topics for in-depth study include but are not limited to a variety of human diseases, circadian clocks, immunity, transposable elements, epigenetic memory, dosage compensation and resistance development in a range of microorganisms and metazoans, including model plant, insect and mammalian model systems.

Learning Hours

Teaching method		*Average hours per week*	*Number of weeks*	*Total hours*
In-class	Lecture	2-3	10	30
	Seminar	4	2	8
	Laboratory			
	Tutorial			

	Practicum			
	Group learning	1	10	10
	Individual instruction			
Other	Online activity			
	Off-campus activity			
	Private study	4.8	13	63
Total hours on task				111

Course Outline

Lectures and tutorial topics are listed below:

DNA, then & now
1) introduction, review & synthetic biology
2) introduction continued & chromatin

Genome plasticity
3) chromatin inactivation
4) synthetic biology: ethics [groups]
5) chromatin elimination
6) genome rearrangements
7) gene conversion [groups]
8) gene amplification
9) trinucleotide repeats and pathologies
10) epigenetic phenomena I: imprinting [groups]
11) gene magnification
12) transposable elements
13) epigenetic phenomena II: prions [groups]

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14) TEs & chromatin
15) gene jumping genes & mutation
16) epigenetic phenomena III: small RNAs [groups]
17) gene transfer: early work & transgenic insects
18) epigenetic phenomena IV: TEs [groups] (M tut in lecture slot)
19) gene transfer: transgenic plants (guest lecture)
20) gene transfer: transgenic yeast & nematodes

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21) the new agriculture [groups]

Genes & development
1) senescence (note that this is a Monday lecture)
2) circadian rhythms
3) seminars & evaluations start
4) cloned mammals [groups]
5) the business of DNA groups
6) student seminars& evaluations
7) student seminars& evaluations
8) eugenics [groups]
9) student seminars & evaluations to end of term

Textbooks/Readings

A course book is available for purchase prior to the 1st week of classes from P&CC (purchase price covers the cost of production and copyright charges).

Suggested Grading Scheme

Component	Weight (%)	Date
Participation P	12%	Throughout (Sept-Nov)
Seminar	18%	TBA (late Oct- Nov)
Research proposal	30%	3rd week of Nov
Referee Exercise	5%	Last week of Nov
Final exam	35%	As scheduled in Dec

Grading Method

In this course, some components will be graded using numerical percentage marks. Other components will receive letter grades, which for purposes of calculating your course average will be translated into numerical equivalents using the Faculty of Arts and Science Letter Grade Input Scheme.

When letter grades are employed, the following scale will be employed for purposes of calculating your course average:

Arts & Science Letter Grade Input Scheme

Assignment mark	Numerical value for calculation of final mark
A+	93
A	87
A-	82
B+	78
B	75
B-	72
C+	68
C	65
C-	62
D+	58
D	55
D-	52
F48 (F+)	48
F24 (F)	24
F0 (0)	0

Academic Integrity and Queen's Code of Conduct

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments and conduct conform to the principles of academic integrity. Information is available in the Arts and Science Calendar (see Academic Regulation 1 - http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations, on the Arts and Science website (see http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity), and at Biology's website (http://www.queensu.ca/biology/undergrad/integrity.html) and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulations on academic integrity

carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

Accommodation Policy, Exam Conflicts, and Other Conflicts

Students who feel they need accommodations for disabilities or extenuating circumstances, or have a conflict between exams or other commitments should consult the Biology Department's website for details about how to proceed (http://www.queensu.ca/biology/undergrad/integrity.html). In general, the earlier a course coordinator is apprised of an extenuating circumstance, the more likely an accommodation can be made. Students are encouraged to be proactive in anticipating difficulties, when it is possible to do so.

Students may apply to write a make-up or deferred exam if they have an exam conflict as defined in the Academic Regulations of the Faculty (See Arts and Science Calendar Regulation 8 - http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations). In this case, the student should report to the Exams Office first to verify that there is a genuine exam conflict. Biology professors will not consider your situation to be a conflict unless it meets the criteria set out by the Faculty of Arts and Sciences.

Students may request a make-up or deferred exam if they have an exam conflict with off-campus travel associated with a field course (e.g BIOL-307/3.0 or 407/3.0) that is held during the fall or winter terms.

Copyright

Accommodation of Disabilities

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact the Disability Services Office (DSO) and register as early as possible. For more information, including important deadlines, please visit the DSO website at: http://www.queensu.ca/hcds/ds/