

## Department of Biology Course Outline

### SC/BIOL 2040 3.00 Genetics Winter 2016

#### Course Description

A study of the organization and behaviour of genes and chromosomes; and their roles in cells, organisms, populations and evolution. Three lecture hours, one tutorial.

#### Prerequisites

SC/BIOL 1000 3.00 + SC/BIOL 1001 3.00, or SC/BIOL 1010 6.00  
Course credit exclusion: SC/BIOL 2040 4.00

#### Course Instructors and Contact Information

##### Dr. Kyle (Vladimir) Belozerov

Office: Farquharson Bldg. Room 020B

Phone: (416)736-2100 ext. 66643

E-mail: vbelozer@yorku.ca (communication by e-mail is HIGHLY preferred)

Office hours: Mon 11:00 pm – 1:00 pm, Wed 12:00 pm – 2:00 pm.

#### Schedule

Lectures: Tuesdays and Thursdays, 1:00 – 2:30 pm; CLH I (**Sorry, absolutely no time to answer questions after lectures – I have to be at a different building at 2:30 pm sharp.**)

Tutorials: Know which tutorial section you are registered in, LSB101

#### Evaluation

<i>Midterm #1</i>	(February 2, 90 min)	<b>15%</b>
<i>Midterm #2</i>	(March 8, 90 min)	<b>20%</b>
<i>Homework and in-class activities</i>		<b>5%</b>
<i>10 Tutorials</i>		<b>20%</b>
<i>10 pop quizzes</i> (given on random dates throughout semester, 5-10 min each, 4-6 LC questions)		<b>10%</b>
<i>Final</i> (cumulative)		<b>30%</b>
<b>TOTAL:</b>		<b>100%</b>

#### Important Dates

First class – January 5, 2016  
Drop deadline – March 4, 2016  
Last class – March 31, 2016  
Midterm #1 – February 2, 2016  
Midterm #2 – March 8, 2016  
Final exam - TBD

## Resources

**Textbook:** BIOL 2040 – Genetics, Klug 11<sup>th</sup> edition Custom textbook. Available at the University bookstore as a bundle with e-text and MasteringGenetics online access. A few copies of the textbook are available on short-term reserve in Steacie Library (2-hour reserve times). You cannot use a used custom text because online access to MasteringGenetics is available to the original purchaser only. Once you have purchased the text, go online, register and create your account at MasteringGenetics.

**Learning Catalytics:** To use Learning Catalytics (LC) you will need a Wi-Fi enabled device (a cell phone, a tablet, a laptop computer) in every lecture. We will use LC for in-class practice questions/problems, and for pop-quizzes. A few electronic devices are available for the students to borrow at Steacie library.

**Course Website:** The BIOL 2040 Moodle site will include all announcements, course materials, resources, discussion forums, and information regarding tutorials. <http://www.yorku.ca/moodle/>. Homework assignments will be given through MasteringGenetics.

## Learning Outcomes

**Upon successful completion of BIOL2040, you will be able to:**

1. Relate concepts from BIOL 1000 and 1001 to those in BIOL 2040.
2. Communicate information, arguments, and analyses accurately and reliably in verbal and written form during class/tutorial activities, and on assignments, quizzes, and exams.
3. Work effectively with others in a tutorial, class, and exam setting.
4. Use genetic terminology in its correct scientific context.
5. Describe the molecular anatomy of genes and genomes.
6. Compare different types of mutations and describe how each can affect genes and the corresponding mRNAs and proteins.
7. Explain the molecular basis, at the protein level, for alleles with different genetic outcomes.
8. Describe the mechanisms by which an organism's genome is passed on to the next generation.
9. Describe the phenomenon of linkage and how it affects assortment of alleles during meiosis.
10. Describe the approaches and methods used to conduct genetic studies in model organisms.
11. Justify the value of studying genetics in organisms other than humans.
12. Analyse phenotypic data and deduce possible modes of expression/inheritance (e.g., incomplete dominance, autosomal, X-linked) from family histories (pedigrees).
13. Extract information about genes, alleles, and gene functions from genetic crosses and pedigree analysis.
14. Interpret results from molecular analyses to determine the inheritance patterns and identities of human genes that can mutate to cause diseases.

15. Apply the results of molecular genetic studies in model organisms to understand aspects of human genetics and genetic diseases.

16. Describe the processes that can affect the frequency of phenotypes (and genotypes) in a population over time.

*Additional learning objectives may be provided for individual topics throughout the course.*

### Course Content

BIOL 2040 (Genetics) is a course designed to help you explore, understand, and apply the foundations of genetics. In this course, we'll be looking at genetics as a method of scientific discovery to solve problems in terms of health and disease, as well as modelling evolutionary processes. Some of the concepts we discuss will seem quite familiar, but if you don't really get them, you won't really understand any of the higher-level concepts. So, that being said, approach this course with an open mind. If we review something, and spend time on it, try to consider why it might be important to review the concept. In this course we'll be moving beyond the basic terminology, but having a firm grasp of that terminology is absolutely essential for success in building a conceptual understanding of genetics. Conceptual understanding of the foundation of genetics is necessary to understand genetic diseases (including non-hereditary ones), breakthroughs in modern medicine, and risks to species on Earth.

### Experiential Education and E-Learning

E-Learning components:

- Moodle Website
- group work in lectures using Learning Catalytics, and in tutorials.

### Other Information

N/A

### Course Policies

1. No makeup tests will be offered. Those students who missed a test with a legitimate documented reason will need to submit the Attending Physician's Statement (APS) and a completed DSA form to the Undergraduate Biology Office (Farquharson 108) within 5 business days of the missed test. If your request is approved, the weight of the missed test will be added to your final exam. Only a "York Attending Physician's Statement Form" or a similarly detailed doctor's note (i.e. not a form stating that you visited a clinic) will be accepted for medical excuses. Booking holiday airfare coinciding with exam dates will not be considered a legitimate excuse.
2. Submit the APS directly to the professor if you missed a pop-quiz within 5 business days of the missed quiz. If your APS is accepted, the points will be transferred to your final exam.
3. Tests and exams will be mostly multiple-choice. If a test/exam includes a written component, you will be given specific instructions on the possibility of re-marking these components.
4. Standard accommodation policies as set by the university will be followed in the course.
5. All students in the course must be familiar with York University's policies on academic integrity. Please consult the following website for more detail:  
<http://www.yorku.ca/academicintegrity/students/index.htm>

### University Policies

#### Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject

to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - <http://www.yorku.ca/academicintegrity/>

### **Access/Disability**

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - <http://cds.info.yorku.ca/>

Counselling & Disability Services at Glendon - <http://www.glendon.yorku.ca/counselling/personal.html>

York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

### **Ethics Review Process**

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

### **Religious Observance Accommodation**

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at

[http://www.registrar.yorku.ca/pdf/exam\\_accommodation.pdf](http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf) (PDF)

### **Student Conduct in Academic Situations**

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-and-or-harassing-behaviour-in-academic-situations-senate-policy/>