Calendar Description: A study of the organization and behaviour of genes and chromosomes; and their roles in cells, organisms, populations and evolution. Three lecture hours, three laboratory hours. One term. Four credits.

Prerequisite: SC/Biol 1010 6.0

Course Goals:

Upon successful completion of BIOL 2040, students will be able to:

• Use genetic terminology in its correct scientific context;
• Describe basic genetic techniques to determine gene location;
• Explain how genetics and evolution fit together;
• Effectively work with others in the laboratory and class setting;
• Appreciate the genetic diversity in the world;

More specific learning goals include:

• Analyse phenotypic data and deduce possible modes of expression/inheritance (e.g., incomplete dominance, autosomal, X-linked, etc.) from family histories.
• Describe the molecular anatomy of genes and genomes.
• Describe the mechanisms by which an organism’s genome is passed on to the next generation.
• Describe the phenomenon of linkage and how it affects assortment of alleles during meiosis.
• Extract information about genes, alleles, and gene functions from genetic crosses and pedigree analysis.
• Describe the processes that can influence the frequency of phenotypes, and thus alleles, in a population.
• Compare different types of mutations and describe how each can affect genes, mRNA and proteins.
• Justify the value of studying genetics in organisms other than humans. (Apply the results of molecular genetic studies in model organisms to understanding aspects of genetic diseases.)
• Cite examples of gene dosage variation and explain why it affects phenotype.
• Explain the molecular basis, at the protein level, for alleles with different genetic outcomes.
• Interpret results from molecular analyses to determine the inheritance patterns and identities of human genes that can mutate to cause disease.

More detailed learning goals on a chapter-by-chapter basis will be provided throughout the course.

Course Details:

Course Website: Moodle (http://moodle.yorku.ca)
• Includes course materials (e.g., lectures), resources and a discussion area. Visit the site regularly

Time and Location: Mon/Wed/Thurs 8:30 – 9:30 am ACE 102

Course & Lab Director: Dr. Tamara L. Kelly
Office: 108 FS
Phone: x22972
Email: tljkelly@yorku.ca
Office hours: by appointment
I will try to post notes before class, but can’t guarantee they will be up in time. Regardless, I will most likely be posting notes as a 2 slide-per-page format. However, you can easily specify when printing the pdfs for your printer to print more than 1 page per page. Please do not email me with your requests as to the format you’d like, as I cannot accommodate all students in a class of more than 200.

What do I need?

  - The 2nd ed. can be used, but I don’t have the 2nd ed. Thus, it is your responsibility to determine corresponding page numbers, etc.
  - **There are copies of the text on reserve at Steacie Library.**
- **There is no lab manual this year.**
- **Clickers:** are required for this course. The class size is very large and clickers offer a great way for both you and I to get feedback on how well you understand the material. Clicker questions will not show up until March 18th, giving you a bit of time to get one. In order to get a new clicker you must place an online order – please see Moodle for more information. There may be some used clickers available from previous 2040 students – these will be listed on the Discussion board in Moodle.

Lectures and Readings:

I will follow the text to some degree, but will often use material from other sources. When readings are posted ahead of lecture, you should come to class prepared (this is particularly true for the background knowledge I expect you to have coming into the course). If lecture notes are available before lecture (which I cannot guarantee) you can print them out and add your own notes to them.

Evaluation:

Assessment will be formalized by Sept. 24th, but will likely resemble:

- Midterm I: 15% Friday Oct. 9th (covers material up to & including Oct. 5th)
- Midterm II: 22.5% Friday Nov. 13th (covers material up to & including Nov. 9th)
- Final exam: 32.5% December examination period
- Labs: 20%
- Clickers/Activities: 5%
- Floating 5: 5% Added to weighting of whichever of the 3 tests you do best on.

Labs:

All the labs are dry-labs, in a tutorial-like setting. For some of these labs, you will have to submit answers to assigned problems as soon as you walk into the lab. The labs are intended to help you integrate concepts introduced in the lectures/text.

You must attend your assigned lab, unless you have written permission from Gesseca Gos, the TA Coordinator. If you do not, you will receive a zero for that lab.

- LABS BEGIN SEPT 21ST. CONSULT THE ONLINE SCHEDULE (POSTED BY SEPT. 16TH)

Accomodation Statement:

Students who feel there are extenuating circumstances that may interfere with their ability to successfully complete the course requirements are encouraged to discuss the matter with the Course Director as soon as possible.

Students with physical, learning, or psychiatric disabilities who require reasonable accommodations in teaching style or evaluation methods are encouraged to consult with the Office for Persons with Disabilities.
(OPD) and ensure that requests for appropriate accommodations are arranged with the Course Director early in the term.

Academic Integrity
Students are expected to be familiar with, and follow, York University’s policies regarding academic integrity. Please consult the lab manual and website below for more details: http://www.yorku.ca/academicintegrity/students.htm

Recommendations:

• Genetics is based on logic, hence the emphasis on problems and problem-solving. Ergo, do suggested problems.
• Watch your vocabulary! Genetic vocabulary, that is. The sciences of genetics and evolution use words that may seem quite familiar to you, in very specific ways. This can create confusion, particularly with respect to words that are often used in everyday language. Make sure when you are reading the textbook, listening in lectures and reading problems, you are thinking of the appropriate scientific definition. You should practice your genetics vocabulary, just like you would a foreign language.
• Look up words you don’t know in the textbook glossary. If you look up words online, make sure that the definitions come from a reliable source (i.e., not Bob’s World of Biology or WikiBio – these may have the correct definition, but there’s no guarantee).
• Study in groups! What one person doesn’t understand, another may be able to teach. Research has shown that helping each other to study improves marks on both sides, for the person being helped to the person explaining the concept.
• Draw it out! If it involves crosses, etc., write it out. Don’t try and rely on keeping everything straight in your head.
• Take notes in class. Helpful, because I often add stuff that’s not from the text and it keeps you awake!
• If you have a question in class, take note of it and ask.
• If your question is long and convoluted then make an appointment with me. Many questions can’t be answered adequately via email, so don’t be surprised if I suggest you make an appointment.
• This course will test your knowledge and understanding of fundamental genetics, in addition to your ability to decipher exam/test questions. Please read questions carefully, and answer the question that is being asked. If there are short answer questions on the tests, do NOT simply look for a keyword and then regurgitate all you ever learned, or wish you learned, about that word. (i.e., you want your instructor to be in a good mood while marking your test. Amazingly, reading an endless blathering on about something completely irrelevant to the question at hand does not do this.) That being said, I’ll try to write questions in a clear manner. If you’re at all confused, ask the instructor for clarification.
• Tempted to defer? Statistically speaking, you shouldn’t. On average, deferred exam marks are 10-15% lower, even if writing the exact same test. Sure you might feel a bit unprepared, but typically students don’t study more given more time. Face we’re all human and procrastination is one of those things we’re quite attached to.
• Prioritize! Got something worth 10% in the lab and thus, about 2.5% of the course vs. a test in Algebra worth 30% of your course mark? Where should you put your effort? This is what university is all about: learning how to prioritize and manage your time.