SC/BIOL 1010 6.0 – Biological Science 2009-2010 Course Outline

Introduction

Welcome to Biology 1010 6.0! Biological Science is an introductory course, introducing major concepts and ideas in the study of life. It is a prerequisite for nearly all other courses in Biology, and is required for all Biology and Biochemistry majors. We usually see many other majors in BIOL 1010 (including other sciences, Health, Arts, Environmental Studies and Fine Arts), so we have a diverse group of students.

In this course, you will be introduced to biological terminology and concepts that underlie this field. While the scope of material in this course is very broad, **students are encouraged to consider common threads and themes** that extend across the various topics. Biology and Biochemistry majors will develop a foundation for further courses and work in biology and related areas; all students (including non-majors) will develop familiarity with this field and gain skills that can be applied in other courses and settings.

Introductory survey courses often seem to be composed of a huge set of known, static facts. In fact, the science of Biology (and other areas) is actually dynamic, questioning and always changing over time. In science, we are constantly challenging existing theories and models as new observations are made. Thus, you should feel comfortable asking questions in class and in the laboratory. We may not always be able to answer your questions, but we can usually help you find out more! Asking questions is an important skill in science (and it's always good to practise!).

The laboratory is a key part of this course, as experimentation, observations and communication of biological phenomena are important aspects of "doing" (and understanding) science. Again, the skills gained in the laboratory component will be valuable in future laboratory courses, and often can be applied in other academic or workplace situations.

Calendar description:

A course for biology students examining unifying concepts and fundamental principles of biology. The course offers an introduction to cell and molecular biology, genetics, ecology and evolution. The laboratory exercises are an integral component, therefore, students must pass the laboratory section in order to pass the course.

Prerequisite: OAC chemistry or 12U chemistry or SC/CHEM 1500 4.00.

Degree credit exclusions: SC/BIOL 1410 6.00, AK/NATS 1910 6.00.

Term:

BIOL 1010 is a full Year (Fall and Winter) course, with classes beginning:

Wed., Sept. 9 [Sections A and B]
Thurs., Sept. 10 [Section C]

There will be neither tutorials nor laboratories in the first week of class.

Course learning objectives:

Upon successful completion of BIOL 1010 6.0, students will be able to:

- appreciate the complexity and diversity of biology.
- use the process of scientific inquiry to make effective decisions/arguments about real-world issues that have a biological component.
- explain how light impacts life in different ways, illustrating this using examples from different organisms.
- describe the role of enzymes in metabolism.
- describe the cell theory in biology, and relate this theory to other biological concepts.
- relate biological structure and function at the level of the cell, organ, and organism.
- explain selection and its role in evolution.
- compare and contrast major biochemical pathways such as cellular respiration and photosynthesis.
- compare and contrast different mechanisms regulating gene expression (in bacteria and eukaryotes).
- describe different types of cell division, and how the cell cycle works in eukaryotic cells.
- relate concepts of mutation, gene expression and the cell cycle to events in cancer.
- describe how chromosome movement during meiosis explains Mendel's principles of independent assortment and segregation.
- solve Mendelian genetics problems involving one or two genes (and dominant/recessive alleles).
- identify patterns of inheritance relating to sex linkage, gene linkage, codominance and incomplete dominance.
- compare and contrast the adaptations involved in organisms (plant and animal) in the transition of water to land.
- explain why evolution is not progressive.
- describe the importance of genetic variation to natural selection and evolution.
- explain why all traits are not necessarily adaptive.
- describe how natural selection acts on individuals to shape evolution in populations.
- use biological terminology with correct scientific meaning and appropriate context.

Laboratory learning objectives:

Upon successful completion of the laboratory component of BIOL 1010 6.0, students will be able to:

- carry out basic biological laboratory activities with safety and reliability.
- develop hypotheses and make predictions in a variety of simple biological laboratory experiments (real or simulated).
- make descriptive observations of biological specimens (via microscope and/or eye).
- prepare clear, appropriately labeled and formatted figures and tables for presentation of results from biology experiments (real or simulated).
- perform basic literature searches and find library resources relating to biological topics.
- organize and display multiple reference courses in a requested format (relating to an acceptable biological journal)
- prepare a simple biology laboratory report in the appropriate format, (including several of the items above) citing and listing references correctly.
- describe what constitutes plagiarism.
- prepare written work that paraphrases (and cites) reference sources appropriately (and otherwise abide by principles of academic integrity).
- effectively and collegially work with others in the biology laboratory and class setting.

Course directors/instructors/coordinator:

Dr. Tanya Noel [Course director, instructor in Sec B, A] – tnoel@yorku.ca
Dr. Tamara Kelly [Instructor in Sec A, B] – tljkelly@yorku.ca

Dr. Michael Gadsden [Instructor in Sec C] – mgadsden@yorku.ca
Dr. Mark Vicari [Instructor in Sec C] – mvicari@yorku.ca

Dr. Julie Clark [Lab director] – jclarkj@yorku.ca

Vivian Vu [TA lab coordinator] - biol1010@yorku.ca

Course components:

Class:
Section A: Mondays, Wednesdays and Fridays 1:30– 2:30 PM, CLH I
Section B: Mondays, Wednesdays and Fridays 1:30– 2:30 PM, CLH L
Section C: Thursdays 7-10 PM, CSE C

There will be some **days where no classes are held** in Sections A and B:

Section A: Oct. 9, Nov. 4, Feb. 12, Feb. 22, Mar. 19
Section B: Oct. 9, Nov. 2, Feb. 12, Feb. 24, Mar. 19

(These are subject to change, especially if we lose a class for unexpected reasons on a different day.)
In Section C, some classes may not run the full 3 hours.

Laboratory: 3 hours in alternate weeks (**see timetable and lab manual** for full details)

The lab exercises and assignments will provide an opportunity for students to:

- explore aspects of biology.
- think like scientists - ask questions, make predictions, test hypotheses, solve problems, evaluate theories and use other aspects of inquiry.
- learn how to communicate scientific information in written form.
- find and understand some of the scientific literature.
- reinforce some key biological concepts.
- become familiar with practical aspects of lab work (using microscope, working safely in a lab, etc).
- work in smaller groups, where students can get to know one another, and their TA.

TA lab coordinator: Vivian Vu (biol1010@yorku.ca). Students should contact the TA lab coordinator regarding missed labs.

Tutorial:
Section A: Mondays 1:30 – 2:30 PM, CLH I
Section B: Thursdays 10:30 - 11:30 AM, CLH L
Section C: Thursdays 5:30 - 6:30 PM, CSE C
(*Tutorials will not occur every week - will be announced as needed*.)

Clickers: Clickers are required for BIOL 1010 classes. Clicker questions/quizzes will contribute to the "Mini-assignments/Activities" portion of the course. **If you purchase the textbook bundle from the Bookstore, a clicker is included.** If you do not purchase the textbook bundle, a clicker can be bought

separately from Computing Services. More details will be provided about clickers in class and Moodle. We will not use clickers in the first week of class.

Website: The BIOL 1010 Moodle site will include announcements, course materials, resources and a discussion forum. http://moodle.yorku.ca or https://moodle08.yorku.ca/moodle/

Text/Readings: "**Biology: Exploring the Diversity of Life**" by Russell et al. 1st Canadian ed. Nelson Publishing.

Other books: "**The Pocket Handbook for Biology**" by Kirszner and Mandell. 2nd Ed. Thomson Wadsworth Publishing is required for the laboratory. (This is bundled with "Biology: Exploring the Diversity of Life" and "**A Problem-Based Guide to Basic Genetics**" by Cronkite.)

There will be copies of the texts on reserve (2 h) in the Steacie Library. Students are expected to read relevant sections of the text **prior** to class**.** Other readings may be assigned during the course.

An optional Study Guide (based on the textbook) is available in the Bookstore.

Note: Other introductory Biology textbooks and writing guides may be used, but students are responsible for using the index/table of contents to determine relevant portions of other books.

Evaluation:

Midterm 1: 15%	**Mon Nov. 2 [Section A], Wed Nov. 4 [B], Thurs Nov. 5 [C]**
Midterm 2: 22.5%	**Dec. exam period (*to be determined by RO*)**
Midterm 3: 15%	**Wed Feb. 24 [Section A], Mon Feb. 22 [B], Thurs Feb. 25 [C]**
Final exam: 22.5%	**Final exam period in April (*to be determined by RO*)**
Laboratory: 22%	(Mandatory, even if repeating the course; run in alternate weeks)
Mini-assignments/Activities: 3%*	

December and April tests will be more cumulative and longer than the November and February midterms.

* Many of the items used in this category will include points for participation/completion. Activities may involve clickers, Moodle quizzes/assignments or in-class exercises. The lowest 20% of mini-assignments/activities will be dropped from the student's score. This is to account for a missed class (e.g., due to illness or other reasons), forgotten clickers, etc.

Reminder: Both lecture and lab components must be passed independently to pass the course. The Y term drop date is **Feb. 6, 2010**.

Accommodation Statement:

Students who feel that 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. Please note: "*Senate policy states that students are expected to monitor their progress in courses, taking into account their personal and academic circumstances, and to make the necessary adjustments to their workload to meet the requirements and deadlines.*" (from Senate Policy of Students' Responsibilities in the Petition/Appeal Processes: http://www.yorku.ca/univsec/senate/committees/sac/sturesp.htm)

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/index.htm

Student information sheet – please see:

http://www.yorku.ca/secretariat/senate/committees/ccas/documents/Course%20Outline%20-%20Student%20%20Info%20Sheet%20-%20March%2027-06.htm

Planned course topics:

Although we've divided up the planned topics between two instructors, there are several underlying themes and threads that extend across all of the portions of the course. The **hierarchical organization** (levels within levels) of life recurs across different topics in biology. The change in genetic characteristics of individuals within populations over time (**evolution**) accounts for the incredible **diversity** of organisms, while explaining the **unity** commonly observed in organisms.

Introduction to biology – Dr. Noel, Dr. Kelly, Dr. Gadsden

Light and life
Selection, biodiversity and biosphere

Cell and molecular biology, genetics – Dr. Noel, Dr. Gadsden

Introduction to metabolism, information and compartmentalization (cells!)
Energy and enzymes
Membranes and transport
Energy and chemical changes: metabolism, respiration and photosynthesis
Cell communication (intro)
The genetic code – DNA and gene expression
Continuity and variety – reproduction, chromosomes, and cell division
Genetics: genes, phenotypes, and patterns of inheritance

Evolution and ecology – Dr. Kelly, Dr. Vicari

Descent with modification – the ideas and the evidence
Evolution of populations – it's more than just natural selection
Speciation – the link between micro- and macro-evolution.
Phylogenies – hypothesis of evolutionary relationships
Diversity of life – relating evolution to ecology
Population Ecology – applying natural selection to life histories
Community ecology/aquatic and terrestrial ecosystems (are we really the top of the food chain?)
Conservation biology

**** Topics and order of topics are subject to change. Some topics may not be given separate treatments, but may be incorporated together. ****

Term	Section A	Section B	Section C
Fall	Introduction to biology Evolution and ecology	Introduction to biology Cell and molecular biology, genetics	Introduction to biology Cell and molecular biology, genetics
Winter	Cell and molecular biology, genetics	Evolution and ecology	Evolution and ecology

Please note: The Sections are NOT interchangeable; to best prepare for the assessments, students should attend the lectures and tutorials for the section in which they have registered.

Resources:

There are many offices and services that provide valuable services/information to our students. We've included information in the Appendices of your lab manual, and this will also be posted online in Moodle.

Policies:

1. If you miss a test with a legitimate documented reason, permission may be granted to take a makeup test (if applicable). **Only a "York Attending Physician's Statement Form" (can be downloaded as part of the Petitions Package) OR a similarly detailed doctor's note (i.e. not a form just stating that the student visited the clinic) will be accepted for medical excuses**. The documentation should cover the date of the missed test. All documentation supporting your excuse for missing a test must be received at the Biology Undergraduate Office within a week of the missed test (or as soon as the student is able to return to school if you are sick for more than a week), but students should contact us as early as possible after a missed test.

2. The tests and final exam may include questions with written answers in addition to multiple choice items. (If we don't have written answers, please disregard this point.) If you believe that a written answer on a test was marked incorrectly, you must submit your (written) rationale and paper for remarking within 1 week of the test being made available to you (if you answered in ink). ***Note: Remarking can result in the mark being raised, confirmed or lowered.***

3. In order to be fair and consistent with regards to the entire class, individual grades are not negotiable. We cannot provide "extra credit" assignments. Marks for assignments and tests will not be "rounded". **Contact the course director about marks ONLY if there is a clear error in your mark** (calculation, clerical, etc.) as soon as possible at tnoel@yorku.ca. It is highly unlikely that you will receive a response regarding any other mark-related queries.

4. Students who do not write the final exam, but have completed all midterms and lab submissions/ reports and assignments by the scheduled dates, must contact the course director for permission to write a deferred exam (i.e., sign the Deferred Standing Agreement form). It is Senate Policy that "*Normal requests for deferred standing must be communicated within one week following a missed examination, or on the last day to submit course work*". Please check out the Registrar's Office Deferred Standing FAQs (http://www.registrar.yorku.ca/services/ds_faq.htm) for more details. Students who have missed one or more midterms (or other major components) will likely be required to petition to write a deferred exam.

5. Email policy: **Students should use their yorku.ca email address for correspondence** relating to the course. (Email from other addresses, such as hotmail or yahoo, are likely to be filtered as spam/junk.) The subject line should include "BIOL 1010" and a brief mention of the topic of the email. (E.g., Subject: "BIOL 1010: Missed midterm 1", or "BIOL 1010 – Ch15 review question 7".) The body of the email should have a clearly written message, and must include your name and student number.

6. **Laboratory policies are available in the lab manual and on the course website**. Students are expected to read these policies, and sign the laboratory conduct agreement before the first laboratory session.