

SC/BIOL 1000 3.0 Biology I – Cells, Molecular Biology and Genetics Summer 2013 Course Outline

Welcome to BIOL 1000 3.0. Biology I is the first half of our introductory Biology 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. The course is taken by students across the University, in other sciences, Health, Arts, Environmental Studies and Fine Arts, so we have a diverse group of students. Grade 12 Biology (or BIOL 1500 3.0) and Chemistry are prerequisites, so we will assume a basic understanding in these areas.

In this course, you will be introduced to biological terminology and major 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/work in biology and related areas; all students will develop familiarity with this field and gain skills that can be applied in other courses and settings. This course is intended to help develop scientific literacy and critical thinking skills required of citizens in modern society.

Introductory survey courses often seem to be composed of a huge set of known, static facts. In fact, the science of Biology, like all sciences, is dynamic, questioning and continually changing. In science, we are constantly challenging existing hypotheses and models through experimentation 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!). We will also encourage you to seek your own answers – another important life skill.

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.

Laboratories begin the week of May 6th (i.e. the first week of classes). Consult your laboratory manual and the BIOL 1000 Laboratory Website on Moodle to determine when your lab section is scheduled.

Course learning objectives:

Upon successful completion of BIOL 1000 3.0, students will be able to:

- Use the process of scientific inquiry to make effective decisions/arguments about real-world biological issues
- Use biological terminology with correct scientific meaning and appropriate context.
- Explain how light impacts life in different ways
- Explain selection and its role in evolution.
- Describe the cell theory in biology, and relate this theory to other biological concepts.
- Describe the importance of membranes, and different mechanisms of membrane transport.
- Relate biological structure and function at the level of the cell, organ, and organism.
- Identify key similarities and differences between prokaryotic and eukaryotic cells.
- Compare and contrast major biochemicals and biochemical pathways (including cellular respiration, photosynthesis, cell signaling).
- Compare and contrast different mechanisms regulating gene expression.
- Describe processes of mitosis and how the cell cycle works in eukaryotic cells.
- Describe how chromosome movement during meiosis reflects Mendel's principles of independent assortment and segregation. Solve Mendelian genetics problems involving one or two genes.
- Describe the relationship between genes, alleles, proteins and phenotype.
- Describe the mechanisms that can lead to genetic diversity, identify patterns of inheritance relating to sex linkage, gene linkage, codominance and incomplete dominance.
- Relate concepts of mutation, gene expression and the cell cycle to events in cancer.
- Describe basic techniques used in recombinant DNA technology and their significance.
- Additional learning objectives will be provided for individual topics – available on the course Moodle site.

Laboratory learning objectives:

Upon successful completion of the laboratory component of BIOL 1000 3.0, 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
- Make descriptive observations of biological specimens (via microscope and/or eye).
- Prepare clear, appropriately labeled and formatted figures and tables for presentation of biological results.
- Perform basic literature searches and find library resources relating to biological topics.
- Prepare a basic biology laboratory report in the appropriate format, 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.

Calendar description:

An introduction to major unifying concepts and fundamental principles of biology, including evolution and cell theory. Topics include cells, biological energetics, metabolism, cell division and genetics. The laboratory and lecture components must be passed independently to pass the course. Six lecture and three laboratory hours per week. One term. Three credits.

Prerequisite: OAC Biology or 12U Biology or SC/BIOL 1500 3.00; OAC Chemistry or 12U Chemistry or SC/CHEM 1500 4.00.

Course credit exclusions: SC/BIOL 1010 6.00; SC/BIOL 1410 6.00.

Required Reading Material:

- **Russell et al. "Biology: Exploring the Diversity of Life"** 2nd Canadian ed. Nelson Publishing. Available in the bookstore.
- **McMillan (2012) "Writing Papers in the Biological Sciences"** 5th Ed W.H. Freeman Publishing is required and must be purchased separately. It is NOT part of the textbook package. This is a valuable writing resource for your entire scientific academic career.
- **Biol1000 Summer 2013 Laboratory Manual** – ONLY available in the bookstore.
- There are copies of the texts on short-term reserve (2h) in the Steacie Library. Students are expected to read relevant sections of the text prior to class or lab. (There will be some short quizzes on readings, announced ahead of time and completed on Moodle.) Other readings may be assigned during the course.
- **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.***

Required Clickers (student response units)

- Turning Point Clickers will be used in this course. Turning Point Clickers with or without an LCD screen can be used.
- Clickers are not bundled with the textbook can be purchased through Computing Services <http://www.yorku.ca/prs/students/purchase.htm>
- New clicker \$42 – submit order online.
- Used clicker \$35 – submit order online AND see staff at William Small Centre Computing.
- Instructors are NOT involved with the selling of clickers.
- **Register your clicker by May 13th, 2013.** See <http://www.yorku.ca/prs/students/register.htm>
- Each student must purchase his or her own clicker. Using a clicker not registered to you is considered a breach of Academic Honesty.
- See "General Clicker Information" document on course Moodle Site for additional information.

Course Moodle Sites

Lecture and Lab Moodle Site

- The BIOL 1000 Moodle site will include announcements, course materials, online quizzes, resources and a discussion forum. <http://moodle.yorku.ca>
- This site will be used for posting course information including lecture slides, exam results and supplementary information. Online quizzes will also be completed on Moodle.

Moodle discussion boards:

- Be sure to read the other threads before you post a question to see if your question has already been answered.
- When posting, be clear specific and professional.
- Discussions are monitored. Messages containing personal attacks, inappropriate language, or other disrespectful contents will be removed. Irrelevant material will also be removed. Follow the York University Student Code of Conduct <http://www.yorku.ca/oscr/codeofrr.html>
- If you notice any inappropriate threads please contact the Course Director.

Disclaimer: While Moodle moderators / instructors will attempt to remove (or edit) objectionable/inappropriate material as quickly as possible, it is not always possible to review every post. All posts made on the forums express the views and opinions of the author and not the moderators / instructors (except for posts by these people) and they cannot be held liable.

Course Contact Information – where to go and who to see:

First Year Biology Office: 102 Life Sciences Building
First Year Biology Program Assistant: Dharti Patel

Course Director: Dr. Nicole Nivillac
Lecture-related email: b1000lec@yorku.ca

Laboratory Director: Dr. Nicole Nivillac
Laboratory Coordinator: Sheila Colla
Laboratory-related email: b1000lab@yorku.ca

E-mail Policies and etiquette

We will try to respond to email within two working days, but this is not always possible. We may also answer your question in the next class meeting if appropriate. Questions and answers that we deem of interest to the entire class will be posted on the appropriate discussion board or sent via course announcements if urgent.

Emails that do not meet the requirements below may not be answered:

- Use your @yorku.ca email address when emailing instructors and others within the university. Email from other sources may be filtered out and not reach the intended recipient.
- SUBJECT LINE - Include the course code, **course section** and brief indication of topic. For example, to b1000lec: BIOL1000A – question regarding plasma membrane
to b1000lab: BIOL1000A – missed lab 2 because of illness.
- **Include your NAME and STUDENT NUMBER at the end of each email.** We work with hundreds of students and the only way we can access your course information is via your student number.
- Remember, you are in a professional environment and thus all your written correspondence, including emails, should be professional. This means full sentences, proper grammar, **NO** text message lingo.
- Before emailing the instructor, consider the nature of your question and whether another resource should be consulted first. For example, lab-related queries should be directed to the lab coordinator.

Course components: The lecture and labs must be passed independently to pass the course

Lectures: There is one course section (A) running in Summer 2013. Lectures will be in Monday, Wednesday and Friday from 11:30am-1:30pm in LAS A (Please see the University schedule).

Laboratory: 3 lab hrs/ week (see **Laboratory Website in Moodle** for full details/schedule). **You must attend your registered section.**

The lab exercises and assignments 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, lab safety, etc).
 - Work in smaller groups, where students can get to know one another, and their TA.
- See the Laboratory Manual and Laboratory Website for lab schedule, policies/rules (including what to do in case of a missed lab), laboratory exercises, assignments and all things related to the lab.
 - Note: Any student NOT following lab safety regulations will be asked to leave the laboratory or will not be permitted to enter in the first place. Makeup labs will not be granted.
 - Students with open-toed shoes and/or with food/drink are NOT permitted in the lab. See the laboratory manual for all laboratory safety regulations.
 - **Additional policies/rules specific to the laboratory are available in the lab manual and on the laboratory website.** Students are expected to read these policies, and sign the laboratory conduct agreement before the first laboratory session.
 - Pre-Lab quizzes are associated with many labs and are completed on the course Moodle site.
 - Permanent lab switches MUST be completed on your own via the normal enrolment system. If there is an opening in a lab section a switch can be made via the enrolment system. If you find another student within your lecture section who would like to switch lab sections with you, you will have to do so via the enrolment system.

Lab coordinator: Sheila Colla (b1000lab@yorku.ca). Students should contact the lab coordinator regarding missed labs. See lab manual for whom to contact in other situations.

Evaluation:

- Test 1: 18%
- Test 2: 22%
- Final exam: 33%
- Laboratory: 22% (Mandatory – no exemptions even if repeating the course)
- Clicker Questions/ Quizzes/ other assignments: 5%*

Tests 1 and 2 will be during class time, and are ~45 minutes. The final exam will cover the entire course and will be ~150 minutes; dates/times/rooms for exams are scheduled and published by the Registrar's Office (RO).

* Many of the items used in this category will include points for participation/completion. These can include clicker questions, Moodle quizzes/assignments or in-class exercises. The lowest 20% of clicker questions/ quizzes (including zeroes) 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 or malfunctioning clickers, etc.

Reminder: Both lecture and lab components must be passed independently to pass the course. All students must take part in and complete all lecture and lab related assignments even if they are repeating the course. The drop date is May 31, 2013.

Test/exam schedule (to be confirmed in class)

Test/ Exam	Date
Test 1	Wednesday May 22 nd
Test 2	Wednesday June 5 th
Final exam	<i>Will be scheduled by the University Registrar</i>

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 Instructor 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>)

- Please submit CDS Accommodation letters to Instructor or First Year Office by May 10th. Please email b1000lec@yorku.ca to make us aware of submissions.
- Please also inform instructor of any religious observance conflicts occurring at any point during the semester, for which accommodation will be required, by May 10th, 2013. Please email these dates to b1000lec@yorku.ca and submit supporting documentation to the first year office (102 LSB).
- 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 instructor as soon as possible (i.e. the first week of class). 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 instructor **in the first week** of 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:

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 at the same time explaining the **unity** commonly observed in organisms.

Topics: (brief)

Introduction to biology

- Light and life
- Introduction to selection and evolution

Cell, molecular biology, genetics

- Cells – an introduction to metabolism, information and compartmentalization
- Membranes and membrane transport
- Energy, enzymes, chemical change
- Selected metabolic pathways (respiration and photosynthesis)
- Continuity - cell division, DNA replication
- Cancer, cell signalling and cell cycle regulation
- Gene expression; continuity vs. variety – reproduction, chromosomes, recombination and meiosis
- Introduction to Biotechnology
- Genetics: genes, phenotypes, patterns of inheritance

Planned topics (with relevant chapters in Russell et al textbook):

Light and Life: **Ch 1**, review purple pages

Evolution, selection, species: **Ch 3 (sections 3.1, 3.4, 3.5, additional relevant information provided in lecture slides)**

Introduction to metabolism, information and compartmentalization (cells)

- Cell theory & cells: **Ch 2 (sections 2.1, 2.3, 2.4a, b, 2.5, F31-F33 purple pages)**, *Bacteria and Archaea: (2.2 and additional relevant information that will be provided in lecture slides); E. coli: F-52 (Purple pages)*. Biotechnology **Ch 15.1**
- Membranes, transport and communication – **Ch 5 (All sections, F40-F43 purple pages for lipids & proteins)**
- Energy, enzymes and chemical changes: metabolism, respiration and photosynthesis - **Ch 4 (4.2b, 4.2d and 4.3 onwards), Ch 6, Ch 7 (all of chapter 7 except section 7.5)**

Continuity

- Cell Division **Ch 8 (8.1, 8.3, 8.4)**
- DNA structure: **Ch 12 (sections 12.2, 12.5)**, replication **Ch 13 (sections 12.3, 13.4)**, purple pages for **DNA**.
- Cell Cycle Control **Ch 8 (sections 8.1, 8.5)** and Cancer **Ch 14 (section 14.4)**

Molecular Genetics

- Gene expression **Ch 13, Ch 14 (14.1 intro, sections 14.2, 14.3)**
- Introduction to Biotechnology: **15.1**

Continuity vs. Diversity – reproduction, chromosomes, recombination and meiosis **Ch 9 (section 9.1, 9.2, 9.3)**.

Mendelian Genetics

- Genetics: genes, phenotypes, and patterns of inheritance **Ch 10, Ch 11 (11.1 in overview; no 11.5b)**

**** Topics and order of topics are subject to change. Some topics may not be given separate treatment, but will be integrated. ****

Please note: in BIOL 1000, to best prepare for the assessments, students *must attend* the lectures.

Resources:

There are many offices and services that provide valuable services/information to our students. We've posted this information online in Moodle.

Course Policies:

1. The format of tests and exams will be primarily multiple choice questions. Questions with written answers may also be used. For written answers, if you believe that a written answer on a test was marked incorrectly, you must submit a written rationale that is based on academic grounds* with your test to the First Year Biology Office within 1 week of the test being made available to you. Only those answers written in ink will be eligible for regrading. *Note: Regrading can result in the grade being raised, confirmed or lowered.*

See Biol1000 Lab Manual for reappraisal information pertaining to laboratory assignments.

**Academic grounds means you make an academic argument for why your answer is correct – statements such as “this grade does not reflect my knowledge” or “I really studied hard and I deserve a better grade” are not academic grounds.*

2. 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” or “bell-curved”. Contact the Course Director about marks ONLY if there is a clear error in your grade (calculation, clerical, etc.) within ONE week of the test score being made available to you at**

b1000lec@yorku.ca.

3. Missed Midterm tests or Exam

Midterm tests:

- You **MUST contact (email) your instructor** (b1000lec@yorku.ca) within TWO days (48hours) of missing the test (the sooner the better).
- Valid and appropriately detailed **documentation** supporting the events (typically medical or emergency related) preventing your attendance **must be submitted to the First Year Biology office within ONE week** of the missed test.
- **IMPORTANT: If you miss because of illness, you MUST see a Physician within 24 hours of the missed test – normally on the same day - so that the Physician can confirm you are too ill to attend the test based on medical examination. Valid documentation for medical situations** consists of an “Attending Physician’s Statement” from the petitions package http://www.registrar.yorku.ca/pdf/attend_physician_statement.pdf or letter/document of similar detail. **A note that simply says you were seen in the clinic will not be accepted.** Any documentation should cover the date of the missed test.
- Death of an immediate family member: death certificate or letter from the funeral director
- Contact your instructor to determine the appropriate documentation required for other circumstances.
- If appropriate documentation is NOT provided within ONE week, a zero will be earned on the missed midterm.
- NOT all situations will be accommodated, meaning that a zero will be earned on the missed test.
- Circumstances not accommodated include, but are not limited to, schedule confusion, sleeping in, missing the bus, personal endeavours (including a job), and busy lives.
- Where appropriate and **ONLY IF POSSIBLE**, makeup tests will be scheduled. These may differ in format from the original test (i.e., include more short/long answer questions).

Final exams:

- If you miss the final exam for a valid reason (e.g. medical emergency, death of an immediate family member) you must request deferred standing and notify the course director within 48 hours of missing the exam.
- See <http://www.registrar.yorku.ca/exams/deferred/index.htm> for additional information.
- To request deferred standing you must complete and submit a Deferred Standing Agreement Form (see the Biology Undergraduate Office or <http://www.registrar.yorku.ca/services/forms.htm>) along with supporting documentation to the First Year Biology Office within ONE week of the missed exam.
- Requests submitted after this time will be denied and the student must formally petition
- Doctor’s notes are NOT sufficient for missed final exams; you **MUST** have your doctor to fill out the Attending Physician’s Statement included in the petitions package (please make sure you are using the current version of the Attending Physician’s statement form). (http://www.registrar.yorku.ca/pdf/petitions/petition_package.pdf).
- If the Course Director approves the deferred standing request the deferred exam normally will be written during the Biology deferred exam period. If the Course Director denies the deferred standing request you must submit a petition to the Faculty through the Office of the Registrar. An academic committee will decide whether or not permission to write will be granted based on the situation and evidence presented. Denied petitions will result in a zero on the final exam. See <http://www.registrar.yorku.ca/petitions/academic/> for information regarding academic petitions.
- Students who miss one or more midterm tests and the final exam must petition for deferred standing.
- The format of the make-up final exam for this course may be essay, short answer, and/or multiple choice.

5. FORUM CODE OF CONDUCT. Students are encouraged to participate in the online Moodle forums to discuss course concepts, organize study groups, and ask questions relating to Biology. The discussion on the forums has typically been polite and respectful, and we hope this will continue. Students are expected to follow the code of conduct in use of the Moodle forums:

- i. Check to see if your question has already been posted. (You can search the forums – you don’t have to read each post!) If your question hasn’t already been asked, please post in the most appropriate area. (E.g., if your question is about a lab submission, your post should be in the “Laboratory” forum.)

Summer 2013 BIOL1000 Course Outline

- ii. Use a clear, informative subject line. Try to be as specific as possible.
- iii. Post comments appropriate to the particular discussion. Off-topic posts may be moved or deleted.
- iv. Be respectful. Posts containing personal insults/attacks/intimidation/profanity will be deleted. (It is also worth remembering that your instructors read forum posts!)
- v. Post only material relevant to BIOL 1000/Biology. Other posts will be deleted.
- vi. While it is appropriate to engage in debate/discourse on biological topics, such discussions should be respectful and evidence-based. Evidence should be from trusted sources – consult with the library if you are not sure! (See: <http://www.yorku.ca/webclass/module4a.html>)
- vii. Any posts which appear to violate our code of conduct may be edited, moved or deleted at the discretion of instructors/moderators. If posts give indications of violations of academic honesty or the York University student code of conduct, further action will be taken.