Department of Biology Course Outline

SC/BIOL2020A 3.00, Biochemistry
Fall 2016

Course Description

A study of the cell biology and biochemistry of biomolecules. Topics include intermediary metabolism related to bioenergetics, including the biology of mitochondria and chloroplasts, protein structure and function, nucleic acid replication, gene expression, chromosome organization and recombinant DNA technology. Three lecture hours.

Prerequisites

Both SC/BIOL 1000 3.00 and SC/BIOL 1001 3.00 or SC/BIOL 1010 6.00; both SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, or SC/CHEM 1000 6.00. Course credit exclusions: SC/BIOL 2020 4.00, SC/BCHM 2020 4.00, SC/CHEM 2050 4.00.

Course Instructors and Contact Information

Course Director: Dr. Mark Bayfield, LSB327E
Email: BIO2020A@yorku.ca

Schedule

Lectures: Tuesdays and Thursdays, 8:30 – 10:00 am, Lassonde A
Office Hours: Thursdays 10:30 – 11:30 am, LSB 1st floor common study area and various online Q&A sessions at times to be determined.

Evaluation

Grading:

Midterm 1: 25%
Midterm 2: 25%
Final Exam: 50%

Section 1 will be tested on Midterm 1 and Section 2 will be tested on Midterm 2. The final exam is cumulative but weighted; it will have a higher proportion of material from section 3 than sections 1 or 2.

Important Dates

DROP DEADLINE FOR THIS COURSE IS November 11th, 2016.

Midterm 1: October 6th, 2016 at 8:30 am

Midterm 2: November 8th, 2016 at 8:30 am

NOTE: for additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website at http://www.yorku.ca/yorkweb/cs.htm

Resources

Text: "Lehninger Principles of Biochemistry" by Nelson and Cox, 6th edition
Lecture slides available via course website accessible via Moodle @ York

Learning Outcomes

Upon successful completion of this course, students should understand the major classes of biomolecules and the mechanisms by which cells express genetic information and utilize and store energy. The students should also to apply concepts covered in the course to problem sets related to current biochemical methods and research.

Course Content

Section	DATE	TOPIC	READING (Lehninger)
Section 1: Buffers, amino acids and protein structure	Sept 8th	Introduction, chemical bonds	Chapter 1
	Sept 13th	Water, acids & bases, buffers	Chapter 2
	Sept 15th	Amino acids	Chapter 3
	Sept 20th	Protein structure (secondary)	Chapter 4
	Sept 22nd	Protein structure (tertiary), protein purification	Chapter 3, 4
	Sept 27th	Hemoglobin, enzymes kinetics	Chapter 5, 6
	Sept 29th	Enzyme kinetics & inhibition	Chapter 6
	Oct 4th	Carbohydrates	Chapter 7
Section 2: DNA & RNA structure and techniques	Oct 6th	MIDTERM 1	
	Oct 11th	Nucleotides and Nucleic Acids	Chapter 8
	Oct 13th	DNA Replication and Repair	Chapter 25
	Oct 18th	RNA transcription and Processing	Chapter 26
	Oct 20th	Translation & Protein Targeting and degradation	Chapter 27
	Oct 25th	Regulation of gene expression	Chapter 28
	Nov 1st	Recombinant DNA technology	Chapter 8, 9
	Nov 3rd	Metabolism and energy transfer	Chapter 13, 15
Section 3: Metabolism	Nov 8th	**MIDTERM 2**	
	Nov 10th	Glycolysis & gluconeogenesis	Chapter 14
	Nov 15th	Oxidation of pyruvate, citric acid cycle	Chapter 16
	Nov 17th	Oxidative phosphorylation and electron transport	Chapter 19
	Nov 22nd	Metabolism of fatty acids	Chapter 17, 21
	Nov 24th	Metabolism of amino acids	Chapter 18, 22
	Nov 29th	Coordination of metabolism	Chapter 23

Other Information

This second year course will focus on a wide range of topics within Biochemistry. In order to fully understand the material presented during lecture, a basic understanding of chemical principles and cellular molecular biology (i.e. BIOL 1000 & 1001, CHEM 1000 & 1001) will be expected of candidate students. Although most of the curriculum can be found in the course recommended text, certain topics, such as the practical application of several biochemical techniques, will NOT be found in the text. Thus, in order to be as successful as possible, each student should attempt to be present for all lectures.

Chapters correspond to Lehninger, 6th edition. Coverage of chapters will not be complete, and where indicated the lectures will cover only selected topics from the chapter. Students are advised to attend all lectures and study those sections of the text relevant to the lecture topics. Exam questions will relate to the lecture topics and any related information presented in the lectures that may not be covered in the textbook.

This course emphasizes the ability to apply knowledge gained in BIOL2020. As a consequence, testing will focus on situations and the ability of the student to analyze data and anticipate outcomes. Again, the critical thinking required by the student would be strengthened by attending all lectures. In order to EARN an “A” in this course, students must demonstrate the ability to apply their knowledge.

Course Policies

1. If you miss an exam (midterm or final) with a legitimate documented reason (unplanned medical or family emergency), documentation must be submitted to me (Dr. Bayfield) in order to avoid receiving a grade of zero on the exam. 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 simply a form stating that the student visited a clinic) will be accepted for medical excuses. I must receive all documentation supporting your excuse for missing an exam within 1 week of the missed exam.

2. In the event of one missed midterm with a valid documented reason, the weight of this midterm will be distributed evenly between the other midterm and the final exam. No makeup exam will be available for midterms. In the event of a missed final exam with a valid, documented reason (where both midterms have been written), a deferred final exam will be offered. In the event that a student misses the final exam in addition to one or both midterms, the student will be required to petition in order to take the deferred final exam.

3. All exams will be multiple-choice.

4. In order to be fair and consistent with regards to the entire class, individual grades are not negotiable. Contact me about marks ONLY if there is a clear error in your mark (calculation, clerical, etc.) as soon as possible at bayfield@yorku.ca. It is highly unlikely that you will receive a response regarding any other mark-related queries.

5. Students who do not write the final exam, but have completed both midterms must contact me 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/exams/deferred) for more details. Students who have missed a midterm will be required to petition to write a deferred final exam.

6. **Clickers**: There is a voluntary clicker component to the class. Students that come to class will be able to use their clickers to participate in some questions/discussions with relevance to the course and to types of questions you may see on exams.

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/spark/academic_integrity/index.html

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.

Student's 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- counselling/what-is-counselling/
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

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-andor-harassing-behaviour-in-academic-situations-senate-policy/