

University of Toronto Scarborough – Department of Biological Sciences
BIOC13 – Biochemistry II: Bioenergetics and Metabolism – Winter 2015

Course Instructor: **Dr. Jason Brown**
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Office Hours:
Wednesdays 8-10am, Thursdays 1-5pm
*I am also available by email and Blackboard Collaborate

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Course Description: A lecture course that introduces cellular metabolism, the process by which living organisms extract and utilize energy from their environment. Topics include: bioenergetics; oxidative phosphorylation; aspects of carbohydrate, lipid and amino acid metabolism; regulation of metabolism; and, the integration of metabolic pathways.

Prerequisites: BIOB10Y3 (or BIOB10H3 and BIOB11H3), CHMB41H3, CHMB42H3

Exclusions: CHMB62H3, BCH210H, BCH242Y, BCH310H, (BGYC13H3)



Sustainability: This course is recognized as a UTSC Green Course which has steps in place to reduce the amount of course-generated paper, encouraging students to print multiple slides per page, double-side printing or using scrap paper.

Lectures: Wednesdays 11:10am-1pm (HW216), Thursdays 12:10-1pm (SY110)

Lecture notes will be posted (in PowerPoint format only) on Blackboard ~24 hours before each lecture. Students are encouraged to use digital copies of these notes for note-taking in class; however, if students prefer to print these notes, they are encouraged to use double-sided printing and/or scrap paper.

At the end of each week (i.e., Friday), two *optional* online quizzes based on the week's lectures will be posted on Blackboard. One quiz will allow students to assess their understanding of the lecture content, and one quiz will encourage students to think critically and creatively about lecture content, as well as apply lecture content to novel situations. These quizzes will help prepare students for exams, and students are strongly encouraged to discuss these quizzes with the course instructor when they encounter any difficulties.

Textbooks: I do not “teach from a textbook”. There will be no assigned readings from any textbook, and only material covered in class will be subject to examination; however, in my experience, many students enjoy having a textbook to supplement their lecture notes. If you so desire, I would recommend the following textbooks:

Biochemistry, 4th edition, Voet and Voet

Copies of this textbook are available in the campus bookstore in both hard cover (~\$187) and loose-leaf (~\$122) versions; this textbook is also available online via www.coursesmart.com (~\$100 for 1 year rental). **The online version of this textbook is the most environmentally-friendly option.**

Bioenergetics 4, Nicholls and Ferguson

An e-book version of this textbook is available **for free** via the UTSC library’s website. UTSC’s license agreement with the publisher of this textbook permits students to use this textbook for course study but does not permit me to post any content of this textbook to Blackboard.

I will post suggested readings from these textbooks on Blackboard; however, these textbooks may discuss material not covered in lecture, and I may discuss material in class not covered by the textbook. ***You are responsible for all material covered in class only.***

Evaluation:

Term Tests	35%	(25% best; 10% worst)
Journal Club Assignments	30%	(6% each for best 4 review blogs; 6% summative blog)
Final Exam	35%	

Important Notes Regarding Evaluations:

Term Tests

The first test will likely take place during the week of Feb 2 (2 hours; date and time TBD by the Registrar’s office), and the second test will likely take place during the week of Mar 16 (2 hours; date and time TBD by the Registrar’s office). The lectures covered on each test will be announced in class and on Blackboard. Tests will comprise of multiple choice, fill-in-the-blank, and short answer questions. Students will have some choice with regards to which questions they answer (e.g., answer 20 out of 25 multiple choice questions). A large proportion of the test questions will require students to think critically and creatively about the lecture content as well as apply the lecture content to novel situations. Additional office hours (both in-person and online via Blackboard Collaborate) will be made available during the week prior to the tests. A student’s best test will be worth 25% of their final grade, and their worst test will be worth 10% of their final grade.

Tests will be marked by the course instructor as quickly as possible (usually within 1 week). Once the tests are marked, a test viewing session will be set up to allow students to view their marked

tests and ask questions. The date and time of these test viewing sessions will be announced on Blackboard and in class. These sessions are governed by the same rules as the test itself.

If you know in advance that you cannot write a test at the scheduled time because it conflicts with some other valid activity, please notify me as soon as possible so that we can make arrangements for you to write the exam at an alternate time.

If you miss a test due to medical illness, then you must submit a detailed UTSC Medical Certificate filled out by the physician you saw on the day of the test itself. This note is due to me within three business days of the test. I will not accept any other medical notes, and if the UTSC Medical Certificate is not completed to my satisfaction, I reserve the right to refuse it. The UTSC Medical Certificate can be found via the following link:

http://www.utsc.utoronto.ca/~registrar/resources/pdf_general/UTSCmedicalcertificate.pdf.

If you miss a test for any other valid reason, please consult with me as soon as possible. I will determine whether the reason given for a missed test is valid in accordance with university policies. Also, I reserve the right to ask for any documentation required to verify the reason given.

Students who miss one test for a valid reason will not be permitted to write a make-up test; rather, the weight of the remaining test will be increased to 35% of their final grade. Students who miss both tests for valid reasons will not be permitted to write make-up tests; rather, the weight of their final exam will be increased to 65% and they will be asked to submit an additional written assignment worth 5%. Students who miss a test for any invalid reason will receive a grade of zero for that test; this will not be negotiated.

Journal Club Assignments

Every other week, beginning the week of Jan 19, one hour of class will be devoted to student-led journal clubs. The purpose of these journal clubs is to help students become more confident with reviewing scientific papers and communicating in a scientific context as well as making connections between lecture content and current research in the field of bioenergetics and metabolism.

For the purpose of these journal clubs, students will work in **groups of 5. (Groups of other sizes will only be permitted where absolutely necessary due to course enrollment.)**

At least 48 hours prior to each journal club session, one student (the “presenting student”) will select a *peer-reviewed* scientific paper and post it to his/her group’s blog site on Blackboard (NOTE: Prior to the first journal club, each group must determine its own schedule for presentations). The scientific papers chosen must (i) be focused on some bioenergetics/metabolism-related topic and (ii) have been published in the last three years (i.e., since 2012, inclusive). At the journal club session, the presenting student will introduce the paper to his/her group members and lead/facilitate discussion of the paper. The goal of this discussion is to evaluate the paper, identifying its major strengths and weaknesses. (During class on Jan 14, the TAs will stage a mock journal club session to introduce students to this process.)

Within 1 week following the journal club session, each group will make a blog post (**no more than 200 words**) which (i) briefly summarizes the paper discussed, (ii) identifies the major strengths and weakness of the paper, (iii) makes a recommendation about whether the paper should be BIOC13-certified, and (iv) is well-written, being free of grammatical and spelling errors. After this blog is posted, the TAs will read the blog and provide each group with further discussion points to which the group members are required to respond over the subsequent week (i.e., before the start of the next journal club session). *Responses should be concise.* Both the initial blog and the group's response will be considered when the TAs evaluate the blog postings. **The maximum mark that a blog can receive if students do not respond to the TAs discussion points is 70%.** Over the course of the semester, each group will complete 5 blogs. Their best 4 blogs will each be worth 6% of their final grade.

Before the last day of classes (Apr 6), each group must make a summative blog post (**no more than 200 words**) which discusses the group's thoughts about the journal club activity and outlines the primary lessons learned as a result of this project. This summative blog posting is worth 6% of the students' final grade.

Final Exam

The final exam (3 hours) will be scheduled by the Registrar's office (Apr 10-25) and will be worth 35% of the final grade. The final exam will cover all material covered in the lectures throughout the course, though it will place emphasis on the material covered since the last test. It will have the same format as the term tests.

Tentative Schedule:

WEEK	WED's LECTURE I	WED's LECTURE II	THUR's LECTURE	OTHER
Jan 5	Introduction to the Course	Bioenergetics and Metabolism: Basic Concepts	Bioenergetics and Metabolism: Basic Concepts	
Jan 12	Glycolysis	Introduction to Journal Clubs	Glycolysis	
Jan 19	Gluconeogenesis & Glycogen Metabolism	Journal Club 1	Citric Acid Cycle	
Jan 26	Citric Acid Cycle	Chemiosmotic Theory	Chemiosmotic Theory	
Feb 2	Respiratory Electron Transport Chains: Electron Transport	Journal Club 2	Respiratory Electron Transport Chains: Electron Transport	Term Test 1 (TBD)
Feb 9	Respiratory Electron Transport Chains: ROS Production	Respiratory Electron Transport Chain: ROS Production	Catch-Up Lecture	
Feb 16	FAMILY DAY & READING WEEK – NO CLASS			
Feb 23	Photosynthesis: Light Reactions	Journal Club 3	Photosynthesis: Light Reactions	
Mar 2	Photosynthesis: Dark Reactions	ATP Synthesis	Catch-Up Lecture	
Mar 9	Lipid Metabolism: Fatty Acid Catabolism	Journal Club 4	Lipid Metabolism: Fatty Acid Catabolism & Ketone Bodies	
Mar 16	Lipid Metabolism: Fatty Acid Synthesis	Lipid Metabolism: Sterol Biosynthesis	Nitrogen Metabolism	Term Test 2 (TBD)
Mar 23	Amino Acid Degradation	Journal Club 5	Amino Acid Synthesis	
Mar 30	Metabolic Control Analysis	Metabolic Control Analysis	Catch-Up Lecture	

Accessibility Needs:

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. I will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff (located in S302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronto.ca.

Academic Integrity:

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's *Code of Behaviour on Academic Matters* (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

- In papers and assignments:*
- using someone else's ideas or words without appropriate acknowledgement
 - submitting your own work in more than one course without the permission of the instructor
 - making up sources or facts
 - obtaining or providing unauthorized assistance on any assignment.
- On tests and exams:*
- using or possessing unauthorized aids;
 - looking at someone else's answers during an exam or test
 - misrepresenting your identity
- In academic work:*
- falsifying institutional documents or grades
 - falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. There are other offences covered under the Code, but these are the most common. ***Please respect these rules and the values that they protect.***