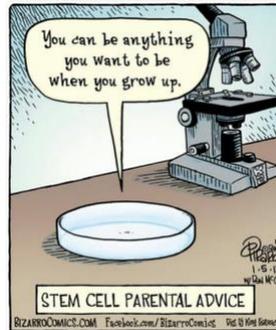


BIOB10H: Cell Biology



Syllabus and Schedule, Fall 2020 Instructor: Dr. Aarthi Ashok

"The key to every biological problem must finally be sought in the cell; for every living organism is, or at some time has been, a cell."
-- E.B. Wilson

Course Description (the boring academic calendar version): This course is designed to introduce theory and modern experimental techniques in cell biology. Emphasis will be on eukaryotic cells. Structure and function of major animal and plant organelles will be covered. Subsequent topics include the role of the cytoskeleton. Plasma membrane and extracellular matrix will also be detailed in the context of cellular interactions with the environment.

Prerequisites: BIOA01H & BIOA02H & CHMA10H & CHMA11H

Exclusions: BIO240H, BIO241H, (BIO250Y)

Course Description (what I really want you to know): Cells are so cool! Every time I teach this course, I learn something new about them and it just gets more and more fascinating! I am excited to share with you what I have learned about these little microscopic units of life, but I want your curiosity and questions to be a large part of how we learn in this course. Together, we will talk about foundational concepts in the field of cell biology; checking out organelles, the cytoskeleton, energetics and cell motility along the way. We will also ensure that the discussion explicitly links these concepts to our everyday lives – including advances in medicine, public health policies, biological research findings, and current societal questions around topics like stem cell therapy, genome editing and “3-parent” babies.

Learning outcomes (LOs):

1. Build a solid foundation of cell/molecular biology topics (detailed list is provided on pg. 4)
2. Demonstrate ability to design experiments and interpret experimental data:
 - Interpret experimental data connected to concepts and techniques discussed in the course
 - Evaluate various cell biology techniques to examine cellular localization and choose appropriate ones for specific experimental design
 - Deduce outcomes for the cell if specific cellular components or pathways were mutant or defective
 - Formulate appropriate experiments that could be designed to test specific hypotheses in the field
3. Connect course concepts with everyday life and current research advances
4. Integrate ideas across concepts (e.g. between lectures)
5. Work collaboratively with peers towards a common goal; communicate your contributions to the team's work

6. Recognize the value of science advocacy and demonstrate skill development in this area
7. Learning how to learn: reflect on and develop effective study strategies

Lectures: The time slot reserved for this course's lectures is Thursdays, 3pm-5pm. My intention is to use the 3-4pm each week as an **online interaction session** via Bb Collaborate. Please consult Quercus announcements for further instructions about this.

All lectures will be posted as links to pre-recorded video files. The lecture recordings will be posted in multiple parts, so as to allow you to work through the content in a manner that is not overwhelming. I know what it feels like to be tethered to your device for hours in this new era of COVID-19! The recorded videos will be added to the Quercus site each week. A couple of notes:

1. I insist on having a talking head of myself as part of the lecture recordings! You will see that I don't always look good and I will make mistakes (and then correct myself), will say 'uhm' and you may occasionally hear my kid run in the room with a snack request or my partner on endless zoom meetings. I want the lectures to still **feel like a real interaction** between us and while life in a pandemic is not ideal for any of us, I am okay to be entirely authentic about it. I hope it will encourage you to do the same.
2. There are points in every lecture where I will ask you to pause the video and reflect on a question, experiment, diagram and write down your answer/notes. This will keep your learning as active as possible, provide you with some logical breaks to reflect on what you've just learned and give you a chance to write down any questions you may have at that point. I encourage you to engage fully with these **"think this through" slides**.

Err...Why are we doing this?

The online learning format can be very effective in helping you become a self-reliant learner, but active learning (learning by asking and answering questions) is known to help students learn more effectively. Interactive online sessions help us build in weekly check-in times to ensure that you are staying on track with your learning and you have a chance to clarify any questions on course content, as we move through the semester. We will use the "think this through" slides from lectures as a launching off point for these interactions.

Tutorials: The scheduled times for tutorials is Thursdays, 5-7pm and this time slot is shared with the other B-level core courses and the BIOB90H Integrative Poster Project. As such, we will not be using these tutorial times on a regular basis; however, I may use this time in Week 6 of the semester as additional synchronous interaction time, if needed. Let's stay in touch through Quercus about this.

Your learning in this course: Effective student learning, engagement with the course material and retention of concepts are important goals for the teaching team of this course. The course TAs and I are eager to help with your learning and development as a UTSC student.

- Please do attend the **virtual interaction sessions and office hours**, use the discussion boards and course email to engage with us, ask questions and seek the help you need to learn. If you are in a different time zone and are experiencing difficulties related to your learning in the course, please get in touch via email and we will do our best to support your remote learning experience in this course.
- To become an effective learner, you need to evaluate and evolve your study strategies. To help you learn how to learn, we have created some resources and reflection activities – **Study Strategies activities**. These were co-designed with students who have previously taken B10 and worked with me as part of the work-study program. We hope that these activities will help you succeed academically in all your courses.

- In many of these interaction sessions, you will have the opportunity to hear from and interact with your peers. **Peer-based learning** is also an important goal in this course and it is my hope that you will use the Digital Mural Assignment in particular, to have some fun and informative exchanges with your peers in a small group environment. It is important to conduct yourself in a friendly and professional manner at all times. Please see [note](#) on Equity, Diversity & Inclusion policy.
- **Facilitated Study Groups (FSGs)**: These weekly study sessions are open to everyone in the class. Attendance is voluntary; however, studies show that students who attend FSGs regularly tend to earn higher grades in the course. If you have any questions, please ask your facilitator, Saim Imran: saim.imran@mail.utoronto.ca visit the FSG website (<https://www.utoronto.ca/ctl/facilitated-study-groups-fsg>), or email the FSG Coordinator, Maggie Roberts at maggie.roberts@utoronto.ca.

The Teaching & Course Administration Team

Instructor: Dr. Aarthi Ashok

Course Email: biob10@utsc.utoronto.ca (please *only* send emails from your UofT email account, so you don't end up in our junk folder; typically expect responses within 48 hours, but not on weekends!)

- I like hearing from students! The TAs and I will do our best to provide responses to your questions – we really appreciate it if you would please pose specific questions in well written, succinct emails. We are not familiar with text speak (!) and would prefer for us all to maintain professional written communication.
- **“Office” hours**: Tuesdays, 1-2pm weekly. No, I won't be in my office, but I will be on a screen and looking forward to your questions! Platform will likely be Bb Collaborate or Zoom. Let's keep in touch on Quercus about this.
- All questions about general course administration and pre-requisites should be directed to the course coordinator, Jennifer Campbell, who is extremely helpful and very popular among students (so make sure you check in with her; see contact info below).

TAs: Carina Carianopol, Jerrica Jamison and Bona Mu.

Course Email: biob10@utsc.utoronto.ca (please *only* send emails from your UofT email account so you don't end up in our junk folder; typically expect responses within 48 hours, but not on weekends!)

- The TAs would be happy to respond to specific, course related questions over email. Believe it or not, these TAs actually want to hear from you too!
- Contact the TAs for all questions regarding any content-related questions as well as the tutorials and assigned weekly readings (from textbook) in the course.

Course Coordinator: Jennifer Campbell; Email: jac.campbell@utoronto.ca

All questions regarding course administration, course pre-requisites and exclusions, exam scheduling, conflicts & viewings, missed exams, marks verifications and any special accommodations pertaining to medical illness, AccessAbility accommodations, religious observances etc. will be addressed by the course coordinator.

Jennifer is very generous with her time and support of students but given that she supports so many of our large foundation courses, we ask that you are patient with her in terms of her response time over email (and please do not expect emails over weekends and holidays).

Textbook: “Molecular Biology of the Cell.” 6th edition. Alberts *et. al.* W.W. Norton & Company (© Garland Science). Available as a loose-leaf text at the UTSC Bookstore.

This is an exceedingly well-written text and will be a useful resource to you in future years even as you take more advanced courses in cell and molecular biology.

Course Quercus page: The main source of information for B10 is the Quercus course page. Please check this site often in order to remain up to date with course information and announcements.

Contains:

- lecture recordings & weekly assigned readings from text (**note:** please take your own detailed notes as you listen to the lectures)
- course syllabus and schedule, discussion boards and mini mental break videos
- quizzes and assignment info and submission links
- important announcements, including information about the course's assessments, exams or additional course resources

Course Schedule:		
Week or Lecture #	Date	Topic [Note: this is a general idea of topics and some discussions may spill over into subsequent lectures] Specific Learning Outcomes (LOs) are listed below.
1	Sep 10 th 2020	COURSE INTRODUCTION; PROKARYOTES & EUKARYOTES STUDYING CELLS
2	Sep 17 th 2020	MACROMOLECULES IN CELLS CELL CHEMISTRY
3	Sep 24 th 2020	PROTEINS: STRUCTURE, FOLDING & REGULATION ORGANELLES IN CELLS
4	Oct 1 st 2020	THE ER: SECRETORY & MEMBRANE PROTEIN SYNTHESIS THE ER: PROTEIN QUALITY CONTROL
5	Oct 8 th 2020	THE GOLGI: VESICULAR TRANSPORT & SECRETION PROTEIN SORTING & LYSOSOMES
Reading week – No class on Oct 15th 2020		
6	Oct 22 nd 2020	ENDOCYTOSIS & PHAGOCYTOSIS STUDYING PROTEINS I
Term Test (Lecture 1-5 inclusive) – October 22nd 2020; Start time: 3pm (length and format, TBD)		
7	Oct 29 th 2020	PLASMA MEMBRANE: STRUCTURE & FUNCTION
8	Nov 5 th 2020	MITOCHONDRIA & CHLOROPLASTS: STRUCTURE
9	Nov 12 th 2020	MITOCHONDRIA & CHLOROPLASTS: ENERGY CONVERSION
10	Nov 19 th 2020	THE CYTOSKELETON: MICROTUBULES & MOTORS
11	Nov 26 th 2020	THE CYTOSKELETON: ACTIN FILAMENTS AND MOTORS INTERMEDIATE FILAMENTS
12	Dec 3 rd 2020	THE EXTRACELLULAR MATRIX AND CELL-CELL INTERACTIONS STUDYING PROTEINS II
Final exam (lectures 6-12 inclusive) – Date, time, format TBD (final exam period)		

- List and define the characteristics of different types of cells, their evolution and their culture *in vitro*
- Identify and describe the different cellular compartments found in eukaryotic cells (e.g. Golgi, mitochondria, vacuoles)
- Explain how cells generate and utilize energy
- List the different types of macromolecules and describe how they are assembled into polymers from monomeric units
- Provide an in-depth explanation of protein synthesis, folding and regulation in cells (e.g. regulation by phosphorylation, secondary and tertiary structure elements etc.)
- Describe cell differentiation and explain the links to stem cells and cell replacement therapies
- Explain co- and post-translational translocation of proteins into cellular organelles using concrete examples (e.g. SRP-mediated translation, mitochondrial and peroxisomal protein import)
- Explain the steps involved in the cellular quality control of proteins in the ER
- Differentiate between the different types of transport vesicles in cells and explain their assembly and intracellular pathways
- Describe intracellular transport processes including those that lead to lysosomes and extracellular secretion of specific molecules
- Compare and contrast the chemical reactions that occur in the mitochondria and chloroplast
- Explain the structure and function of the plasma membrane using examples of specific transport processes that take place across this membrane (e.g. active transport, transporter-based movement of ions etc.)
- Describe and distinguish between the structure and function of the different cytoskeletal elements and how they contribute to cellular processes

- Diagram and explain the steps involved in directed cell motility
- Summarize the characteristics of the different extracellular matrix components and their main functions

Course Assessments:

I am always excited to design assessments that allow students to fully demonstrate their understanding of course concepts. Learning is hard and you will need to invest the time and effort that it takes to really understand cell biology. These assessments will challenge you, but they are designed to be fair and will allow you to feel a sense of pride for doing the hard work of learning in this foundation course.

BIOB10H is one of the participating courses for enrolling in the BIOB90H Integrative Research Poster Project – B90 is a graduation requirement for students who have been accepted into a biology program as of August 2020, on intend to subject post to a biology program after August 2020. The grading schemes below show the breakdown with and without B90.

Without B90:

Midterm test (Lec 1-6): ~2 hours = 23% [LO 1-3]
 Final exam (Lec 6-12): ~2 hours = 25% [LO 1-3]
 Weekly reading quizzes = 24% [LO 1-3]
 Digital mural assignment (note: 2 deliverables) = 20% [LO 1-5]
 Your favourite cell haiku = 5% [LO 1- 3 & 5]
 Study strategies activities (3 deliverables) = 3% [LO 6]

With B90:

Midterm test (Lec 1-6): ~2 hours = 18% [LO 1-3]
 Final exam (Lec 6-12): ~2 hours = 20% [LO 1-3]
 Weekly reading quizzes = 24% [LO 1-3]
 Digital mural assignment (note: 2 deliverables) = 20% [LO 1-5]
 Your favourite cell haiku = 5% [LO 1-3 & 5]
 Study strategies activities (3 deliverables) = 3% [LO 6]
 Integrative research poster project = 10% [LO 1-3]

Midterm test*: October 22nd, 2020 at 3pm

- This exam will test content covered in lectures 1-6 (inclusive).
- This exam will likely be composed of both multiple choice and short answer questions.

Final exam*: date/time TBD (final exam period in Dec)

- This exam will test content covered in lectures 6-12 (inclusive). But, do not forget content from lectures 1-5; I will still refer to the foundation concepts discussed in those lectures and require that you remember them!

Please note that all quiz, activity, assignment and exams will be submitted via Quercus. If any other mode of submission is required, we will inform you of this through announcements on Quercus. Please check the site regularly.

***Testable material**

What should you study from for the course's exams?

- All text and figures from lecture materials provided for all lectures/videos in the course or additional course resources posted on the Quercus page
- Your notes, including any discussion examples and “think this through” slides
- Relevant textbook material from the assigned readings

What is NOT ON the exams?

- Rest assured that I will not test on random text, figures or details from the text that I have not explicitly discussed in the video/lectures!

Special Notes:

What if I miss a deadline for a quiz or assignment?

Deadlines are in firm and designed to help you learn how to manage your time effectively. The penalty for missing weekly quizzes or any of the various assignment submissions is simply a loss of credit for that work – there are no makeup possibilities. However, life happens and so, if there are extenuating circumstances at play, get in touch with me prior to missing any deadlines and we will discuss the issue. If you wish to use the [self-declaration of illness forms](#) or have questions about using them, please contact Jennifer Campbell, our course coordinator.

What if I miss an exam?

If you miss the midterm exam due to a medical illness, you will need to provide a UTSC medical certificate (<http://www.utsc.utoronto.ca/registrar/sites/utsc.utoronto.ca/registrar/files/resource-files/UTSCmedicalcertificate.pdf>) within 48 hours of a missed exam, if you wish to be considered for a potential make up exam. Medical notes must be submitted to Jennifer Campbell, our course coordinator. A single makeup midterm exam may be offered to students who provide significant evidence of extenuating circumstances/illness. Note that the structure of the makeup midterm will differ significantly from the normal midterm for the course and will likely be an oral exam or a written essay style exam, as determined by the instructor. Please contact the course coordinator and check the course Quercus site for further information during the term.

If you miss the final exam due to a medical illness, you would need to submit a petition via the registrar's office and provide them with documentation. The course instructor/coordinator are not responsible for the scheduling of missed final exams and so can't really help you with that.

What if I miss the weekly online interaction sessions?

Remember that the goal of these sessions is to ensure that you have been able to follow the content of the lectures in a logical and timely manner and that you are able to test your understanding of the concepts and apply them to questions that are posed in the "think this through" slides. There is no formal makeup opportunity for missed online interaction sessions but do email me or use the discussion boards to make sure that you get the support you need to learn effectively in this course.

Important course policies:

Equity, Diversity & Inclusion:

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities. [<https://teaching.utoronto.ca/wp-content/uploads/2020/04/Creating-an-Inclusive-Online-Environment.pdf>]

The University of Toronto strives to provide a family-friendly environment. You may wish to inform me if you are a student with family responsibilities. If you are a student parent or have family responsibilities, you also may wish to visit the Family Care Office website at familycare.utoronto.ca. [*Family Care Office at the University of Toronto*]

Notification of Recording of Online Course Meetings & Copyright Considerations: This course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session. Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. Do not download, copy, or share any course or student materials or videos without the explicit permission of the instructor. For questions about the recording and use of videos in which you appear, please contact the instructor. [*Office of the Freedom of Information and Protection of Privacy at the University of Toronto*]

The unauthorised use of any form of device to audiotape, photograph, video-record or otherwise reproduce lectures, course notes or teaching materials provided by instructors is covered by the Canadian Copyright Act and is prohibited. Students must obtain prior written consent to such recording. [*Provostial guidelines on the Appropriate Use of Information and Communication Technology*]

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. AccessAbility Services staff (located in Rm AA142, Arts and Administration Building) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations 416-287-7560 or email ability@utsc.utoronto.ca. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course. [*The Centre for Teaching and Learning, UTSC*]

Academic Integrity:

[From The Centre for Teaching and Learning, UTSC]: Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensure 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* outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>). All suspected cases of academic dishonesty will be investigated following procedures outlined in the **Code of Behaviour on Academic Matters** and could have serious consequences for students including suspension or expulsion from the university. There are other offences covered under the Code, but these are the most common. *Please respect these rules and the values that they protect.*

Important links:

General info site: <https://www.academicintegrity.utoronto.ca/>

FAQs about academic integrity: <https://www.utsc.utoronto.ca/vpdean/faq-0>

Information Literacy: <https://www.academicintegrity.utoronto.ca/smart-strategies/information-literacy-and-academic-integrity/>

Citations, Quoting and paraphrasing: <https://www.academicintegrity.utoronto.ca/smart-strategies/citations-quoting-and-paraphrasing/>

Group work and sharing work with friends: <https://www.academicintegrity.utoronto.ca/smart-strategies/group-work/>

Here's a checklist to use for all assignments in this course. [Centre for Teaching Support and Innovation]

Course code: _____
Assignment title: _____
Instructor's name: _____

I, _____, affirm that this assignment represents entirely my own efforts.

I confirm that:

- I have acknowledged the use of another's ideas with accurate citations.
- If I used the words of another (e.g., author, instructor, information source), I have acknowledged this with quotation marks (or appropriate indentation) and proper citation.
- When paraphrasing the work of others, I put the idea into my own words and did not just change a few words or rearrange the sentence structure
- I have checked my work against my notes to be sure I have correctly referenced all direct quotes or borrowed ideas.
- My bibliography includes only the sources used to complete this assignment.
- This is the first time I have submitted this assignment (in whole or in part) for credit.
- Any proofreading by another was limited to indicating areas of concern which I then corrected myself.
- This is the final version of my assignment and not a draft.
- I have kept my work to myself and did not share answers/content with others, unless otherwise directed by my instructor.
- I understand the consequences of violating the University's Academic Integrity policies as outlined in the [Code of Behaviour on Academic Matters](#).

By submitting this form, I agree that the statements above are true. If I do not agree with the statements above, I will not submit my assignment and will consult the course instructor immediately.

Student name: _____
Signature: _____
Date: _____

Turnitin (Plagiarism Detection Software): Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site. [The Centre for Teaching and Learning, UTSC]

Final note: These are unusual times and please know that the teaching team for BIOB10H will do what they can to support you. **If you are feeling distressed**, there are a variety of supports and resources available on campus. Start here: <https://safety.utoronto.ca/>