BIO 1140 Introduction to Cell Biology
Course outline 2014

General information

BIO 1140 is the second of the two first year biology courses. Whereas BIO 1130 examined the diversity of life, the goal of BIO 1140 is to introduce you to the cellular and molecular fundamentals of living organisms. We will consider the characteristics of cells and the structures within them before focusing in more detail on the structure and function of cell membranes, including their roles in the transport of molecules in and out of cells, cell signalling and cell-cell interactions. We will also consider movements within and by cells, with particular emphasis on the roles of the cytoskeleton and extracellular matrix. Finally, we will consider the fundamentals of molecular biology including gene structure, replication, transcription, translation, protein processing and the cell cycle. Throughout, we will aim to introduce you to the essential information on which upper year courses will build, while at the same time making you aware of the complexities and uncertainties surrounding our basic knowledge of cellular and molecular biology. The lecture component of this course is complemented by laboratories that will provide you with practical skills in microscopy and hands-on experience of cell function. All lecture material will be provided only through the course website available in Blackboard Learn (each section of BIO 1140 has its own website but the three are identical). We hope that you will enjoy this course!

Course description approved by Senate
BIO 1140 Introduction to Cell Biology (3,0,3b) 3 cr.
Origin of life. Structure and varieties of cells. The cytoskeleton and the extracellular matrix. Movements within and by cells including muscles. The cell cycle and reproduction. The fundamentals of molecular biology including replication, transcription and translation. Membrane transport.
Prerequisite: 4U Biology or BIO 1109

Professors

Marc Charette is the co-ordinator for BIO 1140 and is also in charge of the DGDs. Marc should be your first point of contact for matters relating to BIO 1140 (except questions about the course material, which should be directed to the appropriate instructor). He can be found in Gendron Hall room 281 or reached by e-mail (marc.charette@uottawa.ca). Marc's office hours are Tuesday 10-11 am. The BIO 1140 DGDs will run in BSC 140 at the following times: Tuesday 11:30 am-1 pm (TA – Sruthi Atluri) and 5:30-7 pm (TA – Villie Tzaneva), and Thursday 11:30 am-1 pm (TA – Maddie Waddell). Suggestions for topics to be covered in these tutorials can be e-mailed to Marc or the instructors, or posted in the discussion group for this purpose on the course website.

Dr. Katie Gilmour can be found in D'Iorio Hall room 204 or reached by e-mail (kgilmour@uottawa.ca). To get an idea of Dr. Gilmour's research interests and background, check out her web page at http://www.compphys.uottawa.ca. Dr. Gilmour's official office hours for this course are Friday mornings, 9 am to noon. However, feel free to stop by at any time. Or, to be certain of connecting, set up an appointment by e-mail (be sure to include BIO 1140 in the subject line of your e-mail).

Dr. Doug Johnson can be found in Gendron Hall room 256 or reached by e-mail (johnson@uottawa.ca). Dr. Johnson's research interests are summarized at http://mysite.science.uottawa.ca/johnson/. Dr. Johnson's official office hours for this course are Monday 1-2 pm. Or, to be certain of connecting, set up an appointment by e-mail. Include BIO 1140 in the subject line and suggest 3 times that you can visit Dr. Johnson's office. He will choose one and reply.

Dr. Fabien Avaron is the Lab Coordinator for BIO 1140. He can be found in room 106 of the Biosciences Complex, or reached by e-mail (fabien.avaron@uottawa.ca – note: ALWAYS indicate BIO 1140 in the subject field of your message or it will be discarded). Dr. Avaron's office hours are Friday mornings, 10:30 am-12 pm, but you can drop by his office at any time. Visit the BIO 1140 lab website for more information - http://www.biolab1.uottawa.ca/BIO1140/.

Please note: All e-mail correspondence pertaining to BIO 1140 must be carried out using **university e-mail accounts** (i.e. e-mail addresses ending in @uottawa.ca), must include BIO 1140 in the subject field, and must be signed.

Text

The textbook is *Biology. Exploring the Diversity of Life* (2nd Canadian ed., 2013), by Russell, Hertz, McMillan, Fenton, Addy, Maxwell, Haffie and Milsom, Nelson Education. This text was also used for BIO 1130 in the fall term. It can be purchased through the bookstore as a hardcopy text bundled with access to the electronic text and Coursemate learning resources, or alternatively, only the e-book and Coursemate learning resources can be purchased.
The text is very recent and up-to-date; it is also a Canadian edition that involves five authors from Canadian universities (Addy, Haffie, Fenton, Maxwell and Milsom). It is a general biology text; we have opted to use a general biology text rather than a more specialized cell biology text to provide you with a consistent set of resources across the first year biology courses. To increase the relevance of the course material, we will also include material from the scientific literature and references from on-line texts.

It is very important that you have the text (in hardcopy or electronically) and read it. We will use figures directly from the text in lectures, and they will be provided as slides on the website, but the quality is poor compared with the text. In addition, cell biology like all scientific endeavours is a huge field and it cannot all be covered within the lectures - the text functions to supplement the lectures. The text includes self-test questions at the end of each chapter, and these or something like them, could appear on an exam. Additional resources are available through Coursemate. We suggest that you quickly read over the appropriate chapter or pages listed for a particular topic, attend the lectures, then go back and re-read the chapter to get more of the fine details.

Lectures

Location and times by section:
Section A – Marion Auditorium, Tuesday 11:30 am-1 pm & Friday 1-2:30 pm
Section B – Marion Auditorium, Monday 8:30-10 am & Thursday 10-11:30 am
Section C – Marion Auditorium, Monday 2:30-4 pm & Thursday 4-5:30 pm

Location and times by lecture slot:
Monday 8:30-10 am Marion Auditorium Section B
Monday 2:30-4 pm Marion Auditorium Section C
Tuesday 11:30 am-1 pm Marion Auditorium Section A

Thursday 10:00-11:30 am Marion Auditorium Section B
Thursday 4-5:30 pm Marion Auditorium Section C
Friday 1-2:30 pm Marion Auditorium Section A

The tentative list of topics to be covered is below; see "Topics" for more information.

Week	**Dates**	**Instructor**	**Topic heading**	**Lectures (and *suggested readings*)**
1	Jan. 6, 7	KMG/DJ/ Marc	Introduction to BIO 1140	Course introduction (*Course outline 2014)*
	Jan. 9, 10	KMG	Introduction to cell biology	What is a cell? (*Ch. 2 except 2.5, Ch. 3.5, Purple pages F52-F56)*
2	Jan. 13, 14	KMG	Cell membranes	The fluid mosaic model of membrane structure (*Ch. 5*)
	Jan. 16, 17	KMG		Membrane transport and membrane potential (*Ch. 5, Ch. 36.2a-d*)
3	Jan. 20, 21	KMG		The role of membranes in cell signalling part I (*Ch. 5, Fig. 14.12*)
	Jan. 23, 24	KMG		The role of membranes in cell signalling part II (*Ch. 5, Fig. 14.12*)
4	Jan. 27, 28	KMG	Cellular energetics	The energy currency of the cell and ATP generation (*Ch. 4.3, Ch. 6*)
	Jan. 30, 31	KMG		Matching ATP supply to the demand for ATP (*Ch. 6*)
5	Feb. 3, 4	KMG	The cytoskeleton and cell movement	Moving along or with microtubules (*Ch. 2.3f, 2.3g, 8.4*)
	Feb. 6, 7	KMG		The structure and function of filaments (*Ch. 2.3f, 38.1a and b*)
	Feb. 8	**KMG**	**MIDTERM #1**	
6	Feb. 10, 11	KMG	Extracellular interactions	Extracellular structures and cell-to-cell connections (*Ch.2.4c, 2.5, 27.1a, 31.2a*

				and b)
	Feb. 13, 14	KMG	Catch up, wrap up and course evaluations	
	Feb. 17-21		**STUDY WEEK – NO CLASSES**	
7	Feb. 24, 25	DJ	Unit 1-1: DNA and RNA Structures	The basic DNA & RNA structures. (*Chapter 12.1-12.2, pp 257-264. Other sections referred to in the Figures. Material from the scientific literature*)
	Feb. 27, 28	DJ	Unit 1-1: DNA and RNA Structures	The basic DNA & RNA structures. Experimental evidence. (*Chapter 12.1-12.2, pp 257-264. Other sections referred to in the Figures. Material from the scientific literature*)
8	March 3, 4	DJ	Unit 1-2: Chromatin the Dynamic Structure	Looking inside the nucleus from the DNA point-of-view (*Nucleoid pp 30i,163, 467 Chromatin pp 208i,277, 321-322, 322i. Other sections referred to in the Figures. Material from the scientific literature*)
	March 6, 7	DJ	Unit 2: Information flow	Replication (*Chapter 12, p 264-276. Other sections referred to in the Figures. Material from the scientific literature*)
9	March 10, 11	DJ	Unit 2: Information flow	Transcription (*Chapter 13.2 & 13.3, pp 289-294. Other sections referred to in the Figures. Material from the scientific literature*)
	March 13, 14	DJ	Unit 2: Information flow	Translation (*Chapter 13, pp 294-302. Other sections referred to in the Figures. Material from the scientific literature*)
10	March 17, 18	DJ	Unit 2: Information flow	Protein targeting

				(*Chapter 13, pp 302-304. Other sections referred to in the Figures. Material from the scientific literature*)
	March 20, 21	DJ	Unit 2: Information flow	Regulation (*Chapter 14, pp 308-312; 315-321. Other sections referred to in the Figures. Material from the scientific literature*)
	March 22	**DJ**	**MIDTERM #2**	**Up to and including translation**
11	March 24, 25	DJ	Unit 2: Information flow	Regulation (*Chapter 14, pp 308-312; 315-321. Other sections referred to in the Figures. Material from the scientific literature*)
	March 27, 28	DJ	Catch up, course evaluation	
12	March 31, April 1	DJ	Unit 3: The cell cycle	Regulation of the cell cycle (*Chapter 8 pp 174 etc. Other sections referred to in the Figures. Material from the scientific literature*)
	April 3, 4	DJ	Unit 3: The cell cycle	Catch up time, if necessary

Laboratories

Labs take place on the third floor of the Bioscience complex, Monday to Thursday 2:30-5:20 pm and Friday 1-3:50 pm. The labs run on a two-week cycle, with the date/day/room depending on the student's lab section (lab sections are indicated on the personal schedule that can be accessed through uoZone via Rabaska). The detailed lab schedule, the lab manual and information on the evaluation of labs all are available on the lab website at http://www.biolab1.uottawa.ca/BIO1140/. Questions or concerns about the labs should be directed to Dr. Fabien Avaron.

Evaluation

Evaluation of the lecture component of the course will be based on two midterm exams, each worth 15% of your final mark, a final exam worth 40% of your final mark, and series of questions on the recommended readings (worth 5% of your final mark). The laboratory component of the course accounts for the remaining 25% of your final mark and is evaluated separately.

One midterm will be set by each of Drs. Gilmour (Saturday, February 8th) and Johnson (Saturday, March 22nd). Midterms will be 75 min long and will take place in the afternoons (between noon and 5 pm) in two sittings – a detailed schedule will be provided closer to the time

of the first midterm. Dr. Gilmour's midterm will cover all of her material up to and including the material covered in Lecture 9 (February 3rd or 4th). Dr. Johnson's midterm will cover all of his material up to and including Lecture 18: Translation. Both midterms will make use of multiple choice and written answer questions. The final exam will cover **all of the lecture material from the entire course** and will also involve both multiple choice and written answer questions. Each instructor will set questions on his/her own material, and equal weight will be given to each section.

Deferrals
An absence from a midterm examination must be justified in writing, with proof at hand, and be submitted to the instructor in charge of the course **within seven days** following the missed examination (for illness; for other reasons, the instructor must be contacted in advance of the midterm). Examples of acceptable reasons for missing a midterm are religious reasons, medical conditions and serious conflicts.

- Deferral for medical reasons: this deferral must be accompanied by a **medical certificate**, to be delivered to the course co-ordinator (Marc Charette). Please see the relevant pages on the uOttawa website (section 9.5 at http://www.uottawa.ca/about/policies-and-regulations/academic-regulations#).
- Deferral for religious reasons (see section 15 at http://www.uottawa.ca/about/policies-and-regulations/academic-regulations#): contact the course co-ordinator (Marc Charette) at the beginning of the term. Keep the e-mail acknowledging your request, as well as the e-mail confirming your deferral.
- Conflicts: contact the course co-ordinator (Marc Charette) at the beginning of the term. Keep the e-mail acknowledging your request, as well as the e-mail confirming your deferral.

In the case of a justified absence from a midterm exam, either a deferred examination can be written (deferred midterms will take place on Monday, February 10th and Monday, March 24th from 5:30 to 7 pm in MCD 146), or the evaluation component for that midterm can be added to the final exam (i.e. the final will count for 55% rather than 40%). If you cannot write the deferred midterm for any reason, then the mark will be added to the final exam.

You are strongly advised not to make travel plans for the summer until the final schedule for final exams has been posted; we have absolutely no control over scheduling of the final exam. Final exam deferrals must be arranged with the Office of Undergraduate Programs of the Faculty of Science.

Students registered with Access Services should contact the course co-ordinator (Marc Charette) as early as possible in the term.

Finally, please take note of the University of Ottawa Regulation on academic fraud (see section 14.2 at http://www.uottawa.ca/about/policies-and-regulations/academic-regulations#). Note that plagiarism, i.e. use of another person's words, ideas or statistics without acknowledgement of the source, is unacceptable.

Important deadlines for the winter 2014 term

January 6	Classes begin
February 17-21	Study week
March 21	Last day for withdrawal from a course*
April 4	Classes end
April 7-24	Examinations. It may be necessary to schedule examinations during the day for classes held in the evening, and vice versa. Exams may also be held on weekends (day or evening).
June 23	Last day for application to write a supplemental/deferred examination
July 7-11	Exam period for deferred and supplemental examinations

*Withdrawal from a course after the date indicated will appear as a failure on the transcript.