

Bio3316b: Advanced Cell Biology 2023-2024

General Course, Instructor & TA Information

Instructor: **Dr. Gregory Kelly**

Office Location: TBA

Email: gkelly@uwo.ca

Lecture: TBA

Office Hours: TBA.

Teaching Assistants:

Josh Bulfango

Email: ebulfang@uwo.ca, Office Location: TBA

MaKayla Driedger

Email: mdriedg2@uwo.ca, Office Location: TBA

Land Acknowledgement

We/I acknowledge that Western University is located on the traditional territories of the Anishinaabek, Haudenosaunee, Lūnaapéewak and Chonnonton Nations, on lands connected with the London Township and Sombra Treaties of 1796 and the Dish with One Spoon Covenant Wampum. This land continues to be home to diverse Indigenous Peoples (First Nations, Métis and Inuit) whom we recognize as contemporary stewards of the land and vital contributors of our society.

Learn more about Indigenous Initiatives at Western: <https://indigenous.uwo.ca/>

Equity, Diversity, and Inclusivity Statement

We will uphold an equitable and inclusive learning environment for all students in this course and we welcome students from all backgrounds, ethnicities, sexual orientations, and genders. This course is a safe learning environment where any form of discrimination will not be tolerated under any circumstances.

Note: This class is LIVE!

But

There is a contingency plan for an in-person class pivoting to 100% online learning.

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, affected course content will be delivered entirely online synchronously (i.e., at the times indicated in the timetable). The grading scheme will not change. Any remaining assessments will also be conducted online as determined by the course instructor.

Note: Remote Proctoring Software may be used in this course, including in the event of health lock-down. Tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: <https://remoteproctoring.uwo.ca>

The website for the **Office of the Registrar** is <http://www.registrar.uwo.ca>.

In accordance with policy, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Prerequisite Requirements

Biochemistry 2280A; Biology 2382A/B

Entrance into Biology 3316B requires a 70% or better mark in Biology 2328A/B. "Unless you have either the requisites for this course or written special permission from your Associate Dean to enroll in it, you may be removed from this course, and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees if you are dropped from a course for failing to have the necessary prerequisites."

Senate definition for the meaning of letter grades:

- A+: 90-100 One could scarcely expect better from a student at this level
- A: 80-89 Superior work, which is clearly above average
- B: 70-79 Good work, meeting all requirements, and eminently satisfactory
- C: 60-69 Competent work, meeting requirements
- D: 50-59 Fair work, minimally acceptable
- F: below 50 Fail

Course Description

This course focuses on cells' functional organization and physiology with special reference to cell communication mechanisms, intracellular signaling pathways, cellular membranes, metabolism, cell motility, and cell specializations. The course introduces students to the interpretation of primary literature and discusses current developments in the field of cell biology.

Course Outcomes

Upon successful completion of this course, students will be able to:

1. Describe and identify the fundamental signaling pathways involved in cell fate and cell proliferation.
2. Analyze a given experiment and predict the outcome given the knowledge of cell signaling pathways acquired through lecture.
3. Summarize and interpret primary literature in the form of an oral presentation.
4. Link together concepts from multiple disciplines, including cell biology, biochemistry, genetics, and developmental biology.

Course Materials

Textbook: Lodish et al. Molecular Biology of the Cell, 8th Edition or later (recommended).

Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. All course material will be posted to OWL: <http://owl.uwo.ca>

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Evaluation

Electronic devices are NOT allowed during midterms or final examinations. Phones, tablets, or laptops must be off or switched to Airplane mode during exams. Scholastic offences are taken seriously, and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

- Lecture midterm 1 (**non-cumulative**) - **15%** In the event of missing this midterm, the weight will be transferred onto your final exam, 15+40.
- Lecture midterm 2 (**non-cumulative**) - **25%** **An Essential Requirement of this course.** In the event of missing this midterm, you will have to take the scheduled makeup (see below),
- Tutorial presentation - **15%** **An Essential Requirement of this course.**
- Tutorial participation - **5%** **If you miss a tutorial, you will be required to attend another section.**
- Final cumulative exam - **40%** **An Essential Requirement of this course, scheduled by the Registrar.**

Midterms are during lecture times – 50 minutes long and the final, scheduled by the OCR, is 2.5 hrs long.

Midterm #1 – Date: TBA

Midterm #2 – Date: TBA

Only make-up for the 2nd midterm will be scheduled as early as possible following the missed midterm. **There will be no make-up for the 1st evaluation, and 15% will be added to the final exam. Appropriate documentation, however, must be approved by the Academic Counselling Office of your home faculty within 2 weeks of both exams.**

Lecture Topics and Schedule (tentative schedule only, topics may change)

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| Introduction to Cell Signaling pathways |
| Hydrophobic signaling pathways – Retinoic Acid |
| GPCRs, light vision, Cre-lox and RTK signaling |
| EGF signaling, <i>C. elegans</i> vulva differentiation and cell cycle |
| AKT signaling in cell proliferations and apoptosis |
| Apoptosis and Ca ²⁺ signaling |
| Protein degradation pathways and canonical Wnt signaling |
| Non-canonical Wnt signaling |
| Autophagy |
| mTOR signaling |
| Hedgehog signaling |
| Signaling through the primary cilia |
| Hippo and Notch signaling |
| Neurodegenerative diseases |
| Insulin signaling |
| ROS and redox signaling |
| Redox signaling in the context of other signaling pathways |
| Pathogens and their effects on cell signaling pathways |

Course Website

Scheduled office hours and/or the **OWL Forum** (<http://owl.uwo.ca>) are the primary ways to ask questions regarding lecture material; TAs will be monitoring the Forum regularly, and it is encouraged that other students address questions from their peers.

Tutorials & Tutorial Schedule

Tutorial presentations are TBA. Students may choose to miss the tutorials in which they are NOT presenting; however, they will be required to attend an alternate tutorial section and have the proper documentation/accommodation (See Below). **Tutorial presentations are an essential course requirement and, as such, require academic accommodation. Attendance is required; see below.** Your tutorial partners for presentations will be assigned randomly by one of the TAs; assignments will be posted on OWL.

Tutorial Room Assignments: TBA

Tutorial Schedule: TBA

You MUST attend and sign in at the end of each tutorial in order to be awarded the 5% tutorial participation. **Missing a SINGLE tutorial without having the approval from the Academic Counselling Office of your home faculty or leaving a tutorial early without proper accommodation will result in a mark of ZERO for the ENTIRE participation mark.** Note that in all cases where documentation (medical or otherwise) is required, it can *only* be collected by the student's Dean's Office Academic Counselling unit.

Presentation Guidelines:

Students will present in groups of 2 a 15-minute (plus 3 minutes of questions) presentation

summarizing, interpreting, and critiquing a primary research article discussing a topic in cell biology. In the event of a tutorial having an odd number of students, a group of 3 may be assigned, where students will be required to present a 22-minute presentation.

Students will send their respective TA a PDF of their chosen research article for approval AT LEAST 7 days prior to the presentation date. Failure to send an article for approval by that time will result in an automatic **5% deduction** from the tutorial presentation. If the TA deems your article not suitable for presentation, you will be given 1 additional day per submitted article to produce an additional article without facing the **5% deduction**.

Students who are not presenting are required to participate in the tutorial by asking the presenters questions during the question period and are required to provide the presenters with constructive feedback on their presentation skills through anonymous comment sheets that will be compiled by the TAs and given to presenters at the end of the term.

Student Absences

Note: Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

If you are unable to meet a course requirement due to illness or other circumstances dictated by UWO policy, and if you are a Science student, the Academic Counselling Office of the Faculty of Science can be contacted at:

https://www.uwo.ca/sci/counselling/advising_services/counselling_hours.html. Note that approval of accommodation for any course component worth 10% or more can only be made by the student's Dean's Office/Academic Counselling unit.

Assessments worth 10% or more of the overall course grade:

By policy, academic considerations for work totaling 10% or more of the final course grade can be granted only by the student's Faculty of Registration (typically by their academic counsellors). For work totaling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible.

For further information, please consult the University's medical illness policy at:

[//www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf)

The Student Medical Certificate is available at:

[//www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf)

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you can. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation"

(e.g., more than 2 exams in a 23-hour period, more than 3 exams in a 47-hour period).

Academic Consideration by Instructor for work worth less than 10% of the overall grade in a course

Instructors are encouraged, in the first instance, to arrange participation requirements and multiple small assignments in such a way as to allow students some flexibility.

A student seeking academic consideration for any work worth less than 10% must contact the instructor or follow the appropriate Department or course-specific instructions provided on the course outline.

In arranging academic consideration, instructors will use good judgment and ensure fair treatment for all students. Instructors must indicate on the course outline how they will be dealing with work worth less than 10% of the total course grade. In particular, instructors must indicate whether medical documentation will be required for absences, late assignments or essays, missed tests, laboratory experiments or tutorials, etc. Where medical documentation is required, such documentation must be submitted by the student directly to the appropriate Faculty Dean's office, and it will be the Dean's office that will make the determination whether academic consideration is warranted. Given the University's [Official Student Record Information Privacy Policy](#), instructors may not collect medical documentation.

In all cases where academic consideration is being sought for work totalling 10% or more of the final grade in a course, students will be directed to the appropriate Faculty Dean's office.

Students who have been denied academic consideration by an instructor may appeal this decision to the appropriate Faculty Dean's office but will be required to present appropriate documentation.

A student may appeal a decision on academic consideration made by the Dean's Office of the student's Home Faculty to the Senate Review Board Academic (SRBA) as set out in the [Undergraduate Student Academic Appeals](#) policy.

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education if you have any questions regarding accommodations.

http://academicsupport.uwo.ca/accessible_education/index.html

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being:
<https://www.uwo.ca/se/digital/>

Additional student-run support services are offered by the USC: <https://westernusc.ca/services/>

This course is supported by the Science Student Donation Fund. If you are a BSc or BMSc student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students' Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing the online form linked from the Faculty of Science's Academic Counselling site. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the Chair of the Department or email the Science Students' Council at ssc@uwo.ca.

Emailing Policy

Students are encouraged to use the OWL Forum as their primary way of asking questions related to lecture material. Please use this forum before emailing Dr. Kelly or the TAs a lecture-related question.

When students email either Dr. Kelly or the TAs, they must use their UWO email and have Bio4338 followed by the nature of the email in the subject line. When emailing after regular working hours allow 24 hours before expecting a response. Emails sent on a weekend will be answered 24 hours after the next business day. **Any email received where the question can be answered by reading the course outline will not be returned!** Likewise, no emails or forum posts will be addressed 24 hours before the midterm and final exam.

Inappropriate language on the Forum or in emails will not be tolerated under any circumstances and will be reported.

Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the

University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities is as follows:

Support Services

The University recognizes that a student's ability to meet their academic responsibilities may, on occasion, be impaired by medical illness. Illness may be acute (short term), or it may be chronic (long term), or chronic with acute episodes. Academic Consideration provides students with consistent, fair, and pedagogically appropriate consideration, without compromising the academic integrity of the course or program, when they have been unable to complete some component of a course due to short-term extenuating circumstances. Students who have long-term or chronic medical conditions (physical or mental) that may impede their ability to complete academic responsibilities are directed to seek Academic Accommodation through Accessible Education ([Academic Accommodation for Students with Disabilities](#)).

Policy for Academic Consideration for Medical Illness – Undergraduate Students

The University further recognizes that medical situations are deeply personal and respects the need for privacy and confidentiality in these matters. However, in order to ensure fairness and consistency for all students, academic consideration for work representing 10% or more of the student's overall grade in the course shall be granted only in those cases where there is documentation indicating that the student was seriously affected by illness and could not reasonably be expected to meet their academic responsibilities.

Documentation shall be submitted, as soon as possible and no later than 48 hours after the end of the period of absence covered, to the Academic Counselling unit or Dean's Office of the student's Home Faculty together with a request for relief specifying the nature of the academic consideration being requested. These documents will be retained in the student's file and will be held in confidence in accordance with the University's [Official Student Record Information Privacy Policy](#). Once the petition and supporting documents have been received and assessed, appropriate academic consideration shall be determined by the Dean's Office in consultation with the student's instructor(s). Academic consideration may include extension of deadlines, waiver of attendance requirements for classes/labs/tutorials, arranging Special Exams or Incompletes, re-weighting course requirements, or granting late withdrawals without academic penalty. Academic consideration shall be granted only where the documentation indicates that the onset, duration and severity of the illness are such that the student could not reasonably be expected to complete their academic responsibilities. (Note – it will not be sufficient to provide documentation indicating simply that the student “was seen for a medical reason” or “was ill.”)

Whenever possible, students who require academic consideration should provide notification and documentation in advance of due dates, examinations, etc. Students must follow up with their professors and their Academic Counselling office in a timely manner.

Documentation from Family Physicians/Nurse Practitioners and Walk-In Clinics

A Western Student Medical Certificate (SMC) is required where a student is seeking academic consideration. This documentation should be obtained at the time of the initial consultation with the physician/nurse practitioner or walk-in clinic. An SMC can be downloaded at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

Documentation from Student Health Services

At the time of illness, students should make an appointment with a physician/nurse practitioner at Student Health Services. During this appointment, request a Student Medical Certificate from the Physician/Nurse Practitioner.

Policy for Academic Consideration for Medical Illness – Undergraduate Students

Documentation from Hospital Urgent Care Centres or Emergency Departments

Students should request that an SMC be filled out. Students may bring this form with them or request alternative Emergency Department documentation. Documentation should be secured at the time of the initial visit to the Emergency Department. Where it is not possible for a student to have an SMC completed by the attending physician, the student must request documentation sufficient to demonstrate that their ability to meet their academic responsibilities was seriously affected.

How to Succeed in this Course

This course will be challenging to the best of students as it is often the first time interacting with primary research as well as understanding complex concepts at a sub-cellular level. In order to do very well in this course, you **MUST** attend all lectures, and you are encouraged to ask questions during the lecture, on the forum and/or to attend office hours if there is anything that is not clear to you. There are **NO** taped lectures and missing an exam and not following the appropriate rules will result in a 0, no exceptions!

Try not to think of this course **in a linear fashion**; there are overlapping concepts between almost all the signaling pathways and diseases we will discuss, so try and identify where those connections are in the lecture material. Also, do not forget what you have learned from previous courses in genetics, physiology and biochemistry, as they are just as relevant in those classes as they are in this one; everything is connected! Finally, be aware of deadlines and expectations; as an example, just showing up to all the tutorials is an easy 5%, do not lose it for being lazy!

This syllabus will be posted on the OWL website assigned to the course.