

Department of Physiology and Pharmacology
Diseases of Ion Channels - Physiology 4600A

Course Outline for Fall 2026

This course takes place at Western University, which 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.

Students who are in emotional and/or mental distress should refer to <https://www.uwo.ca/health/> for a complete list of options about how to obtain help.

1. Technical Requirements:



Stable internet connection



Laptop or computer

2. Important Dates:

Classes Begin	Reading Week	Classes End	Study day(s)	Exam Period
September 9	October 10-18	December 9	December 10	December 11–22

September 30, 2026: National Day for Truth and Reconciliation; non-instructional day

September 17, 2026: Last day to add or drop a Fall 12-week course

November 30, 2026: Last day to withdraw from a Fall 12-week course without academic penalty

3. Contact Information

Course Coordinator	Contact Information
Wei-Yang Lu	e-mail: wlu53@uwo.ca

Instructor(s) or Teaching Assistant(s)	Contact Information
Wei-Yang Lu (Instructor)	e-mail: wlu53@uwo.ca
Alexander Rico (Teaching Assistant)	e-mail: arico@uwo.ca

4. Course Description and Design

Delivery Mode: in-person

This is a 4th year course on ion channel related diseases, including congenital hearing loss, cataracts, cardiac arrhythmias, immunodeficiency, and some neurological diseases. We will cover physiology and pathophysiology of relevant ion channels.

Anti-requisite: None

Prerequisites: Physiology 3120 and Physiology 3140A.

2 lecture hours (lecture vs seminar approximately 3:2). 0.5 cr course

The course involves lectures as well as student participation through presentation and discussion of research papers. There will be several major assessments in this course including a midterm test, final exam, oral presentation, and a written summary of the presentation. The presentation will be done in a group of 2 students, with papers provided one week before the presentation.

Unless you have either the requisites for this course or written special permission from your 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 in the event that you are dropped from a course for failing to have the necessary prerequisites.

Timetabled Sessions

Component	Date(s)	Classroom	Time
lectures and student presentations	Thursdays	SSC-3006	12:30 – 14:20 pm

- ☒ Attendance at sessions is required
- ☒ Students are expected to read the papers prior to student presentations

All course material will be posted to OWL Brightspace: <https://westernu.brightspace.com/d2l/login>. Any changes will be indicated on the OWL Brightspace site and discussed with the class.

If students need assistance, they can seek support on the [OWL Brightspace Help](#). Alternatively, they can contact the [Western Technology Services Helpdesk](#). They can be contacted by phone at 519-661-3800 or ext. 83800.

Current versions of all popular browsers (e.g., Safari, Chrome, Edge, Firefox) are supported with OWL Brightspace; what is most important is that you update your browser frequently to ensure it is current. All JavaScript and cookies should be enabled.

5. Learning Outcomes

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

- Understand/explain the mechanisms of channel physiology and how diseases are related to ion channel function.
- Critically evaluate primary research literature.
- Analyze experimental approaches used in ion channel research.
- Communicate scientific findings effectively in both oral and written formats.

Course Content and Schedule

Week	Dates	Topic	Instructor
1	Sept 10	Course introduction and how to present scientific papers	Wei-Yang Lu
2	Sept 17	Lecture: Ion channels and diseases, and calcium signaling	Wei-Yang Lu
3	Sept 24	Lecture: Calcium-release activated calcium (CRAC) channels	Wei-Yang Lu
4	Oct 1	3 paper presentations	Wei-Yang Lu
5	Oct 15	Lecture: CRAC channel mutations and immunodeficiency + 2 paper presentations	Wei-Yang Lu
6	Oct 12–18	Reading Week – starting on October 10 th	
7	Oct 22	Midterm exam	Wei-Yang Lu + Alex Rico
8	Oct 29	Lecture: Receptor-operated TRPC channels	Wei-Yang Lu
9	Nov 5	3 paper presentations	Wei-Yang Lu
10	Nov 12	Lecture: TRPC channel mutations and neurological disorders + 2 paper presentations	Wei-Yang Lu
11	Nov 19	3 paper presentations	Wei-Yang Lu
12	Nov 26	Recorded lectures: Gap junction channels and related diseases (by Dr. Donglin Bai)	
13	Dec 3	Course Review, and key concepts of gap junction physiology and disease + 1 paper presentation	Wei-Yang Lu
14	Dec 7–22	Final exam	Wei-Yang Lu + Alex Rico

6. Participation and Engagement

- ☒ Students are expected to participate and engage with content as much as possible
- ☒ Students can participate during lectures, in class discussion, and student presentation sessions
- ☒ Students can also participate by interacting on the discussions board in OWL Brightspace with their peers, TA, and instructor

7. Assessment and Evaluation

Below is the evaluation breakdown for the course. Any deviations will be communicated.

Assessment	Format	Weighting	Due Date	Flexibility
Midterm exam	Multiple short answer questions and an essay (Covering lectures and presentation papers)	32%	October 22 (in class)	Not applicable
Final exam	Multiple short answer questions and an essay (Covering lectures and presentation papers)	38%	December exam period	Not applicable
Presentation	Oral presentation of an assigned research paper using PPT by two students	20%	See presentation schedule	Designated assessments (To be introduced during course introduction)

Paper Summary	Written summary of the presentation paper by the two students.	5%	1 st Monday after presentation	Late submission is accepted; however, a penalty of 20% per day will apply
Participation	Participation includes serving as a Discussion Leader when assigned and asking at least two substantive questions during other students' presentations throughout the term.	5%	Regular attendance (4%) will be recorded. Discussion leader (1%)	See below: General information about assessments"

Information on academic consideration policy of assessment and missed course work.

Designated Assessment: Student Presentation

- Designated Assessment: Instructors are permitted to designate one assessment per course per term for which supporting documentation is required to receive academic consideration.
- The designated assessment in this course is the student presentation, the requirements of which will be explained during the introductory class.
- Papers for student presentations will be distributed one week before the presentation date (Thursday afternoon).
- Students will indicate unavailable dates through OWL. The final presentation schedule will be prepared by the course coordinator to accommodate student availability as reasonably as possible.
- There will be up to **12-13** research papers presented during this term. Each paper will normally be presented by two students. Depending on enrollment, this arrangement may be modified to small-group presentations if necessary. Students are strongly encouraged to identify a presentation partner and sign up for a presentation date as early as possible.
- Presentations must be delivered using PowerPoint or an equivalent presentation format. Each presentation should be approximately 20 minutes in length and should clearly describe:
 - The objectives and background of the study;
 - Relevant experimental methodologies;
 - Major findings and results; and
 - Key observations, conclusions, and their significance.

Emphasis should be placed on the physiological mechanisms under investigation and the pathophysiology of the associated diseases.

- Presentations will be evaluated based on:
 - The effectiveness with which the key points of the paper are communicated within the allotted time; and
 - The presenters' ability to respond to questions and engage in scientific discussion.
- A 5–10-minute question-and-answer period will follow each presentation and will be moderated by the assigned Discussion Leaders.
- Following the presentation, presenters must submit a written summary of the paper to both the instructor and the TA in Microsoft Word format. The instructor will review and edit the summary before it is posted on the course website.
- The summary should be approximately two pages in length (single-spaced, 12-point font) and include:

- The hypothesis and objectives of the study;
- A brief description of the methods; and
- The principal results and conclusions.
- As with the presentation itself, the written summary should accurately and clearly communicate the key findings and significance of the original research paper. Students are responsible for ensuring that the correct Word file is submitted. Incorrect submissions, including corrupted or unreadable files, may be subject to late penalties.

Information about flexibility in assessment

- ☒ Flexibility in assessment has been applied to this course; therefore, academic consideration requests may be denied on the assessments where flexibility is included .
- ☒ Presentation summaries are expected to be submitted by the following Monday. Late submissions will be accepted, but will incur a penalty of 20% per day, deducted from the total 5% of the course grade allocated to the summary.

General information about assessments

- ☒ After receiving feedback on an assessment, students are encouraged to allow 24 hours to review and reflect on the comments before contacting the evaluator. To facilitate a timely response, questions regarding feedback should be submitted within 7 days of the assessment being returned.
- ☒ Participation (5%) consists of attendance and engagement in lectures and presentations (4%) and serving as a Discussion Leader (1%). To earn the 4% participation component, students are expected to attend class regularly (attendance will be recorded) and ask at least two substantive questions about presented papers during the term. Students assigned as Discussion Leaders are responsible for leading discussion during their designated session. If a Discussion Leader misses their assigned session, this requirement may be fulfilled only if another discussion-leader opportunity becomes available later in the term; otherwise, the student will forfeit the 1% Discussion Leader component.
- ☒ If a student misses the scheduled presentation due to an approved academic consideration, the student could be rescheduled for another new paper or if the schedule is impossible to schedule an additional student presentation in class time, we may need to schedule a presentation outside of class time presented to TA and the relevant instructor within 3 days of scheduled presentation.
- ☒ One make-up examination will be offered for students with approved academic consideration. Students who miss the exam or make-up exam without approved academic consideration will receive a grade of zero for that assessment.
- ☒ Students are responsible for ensuring that the correct file version is uploaded; incorrect submissions including corrupt files could be subject to late penalties
- ☒ Written assignments will be submitted to Turnitin (statement in policies below). Students will have unlimited submissions to Turnitin.
- ☒ A student might not receive the same grade as their group members if it is determined that the distribution of work was not equal
- ☒ Assessment re-grading could result in the mark increasing, decreasing, or remaining the same
- ☒ Grade appeals related to assignments or the midterm examination must be submitted within three weeks of the grade being posted. Appeals received after this period may not be considered.
- ☒ Prior to the filing of a written request for relief, students must attempt to resolve the concern regarding a mark or grade through informal consultation with the instructor. If the student is dissatisfied with the instructor's decision or does not receive a decision from the instructor, a written request for relief must be submitted to the Undergraduate Chair within three (3) weeks from the date that the mark was issued.

The table below outlines the University-wide grade descriptors.

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

Information about late or missed assessments:

- ☒ Make-up assessments may be a different format than the original assessment
- ☒ Successful completion of the midterm examination, final examination, and student presentation is required to pass the course. Students who do not complete any of these components and receive an Incomplete (INC) grade must complete the outstanding requirement(s) when the course is next offered.

INC (Incomplete Standing): If a student has been approved by the Academic Advising Office (in consultation with the instructor/department) to complete term work at a later date, an INC will be assigned, which could impact program progression. Students with INC will have their course load in subsequent terms reduced to allow them to complete outstanding course work. Students may request permission from Academic Advising to carry a full course load for the term the incomplete course work is scheduled.

SPC (Special examination): If a student has been approved by the Academic Advising Office to write a Special Examination and the final exam is the only outstanding course component, an SPC will be assigned. If the class has a makeup exam, the student is expected to write the makeup exam. If the class doesn't have a makeup for the final exam the student will write the exam the next time the course is offered, which could impact program progression. Outstanding SPCs will reduce the course load for the term the exam is deferred as outlined in [Definitions of Types of Examinations](#) policy. If a student misses an SPC exam and is approved for academic consideration, they will be withdrawn from the course without academic penalty. If a student misses an SPC exam and is not approved for academic consideration, they will receive a grade of zero on the exam.

8. Communication

- ☒ Students should check the OWL Brightspace site every 24–48 hours
- ☒ Students should email their instructor(s) and teaching assistant using email
- ☒ Emails will be monitored daily; students will receive a response in 24–48 hours
- ☒ This course will use discussions on Brightspace
- ☒ Students should post all course-related queries on the discussion forum so that everyone can access the questions and responses

9. Office Hours

- ☒ Office hours will be available in person or remotely via Zoom
- ☒ Office hours will be scheduled as needed and by appointment
- ☒ Appointments for office hours should be arranged through email communication with the instructor.
- ☒ Office hours will be individual

10. Course Materials

- ☒ All resources will be posted on OWL Brightspace

11. Professionalism & Privacy

Western students are expected to follow the [Student Code of Conduct](#). Additionally, the following expectations and professional conduct apply to this course:

- ✓ All course materials created by the instructor(s) are copyrighted and cannot be sold/shared/upload (e.g., Must Knows Facebook group, Course Hero, Chegg, ChatGPT, etc.)
- ✓ Recordings are not permitted (audio or video) without explicit permission
- ✓ Permitted recordings are not to be distributed
- ✓ **Students will be expected to complete an Academic Integrity Pledge before selected assessments. This may include, for example, declaring any use of generative AI tools in the preparation of presentation summaries and specifying the extent of such assistance (see above).**

Western is committed to providing a learning and working environment that is free of harassment and discrimination. All **students**, staff, and faculty have a role in this commitment and have a responsibility to ensure and promote a safe and respectful learning and working environment. Relevant policies include Western's [Non-Discrimination/Harassment Policy](#) (M.A.P.P. 1.35) and [Non-Discrimination/Harassment Policy – Administrative Procedures](#) (M.A.P.P. 1.35). Any **student**, staff, or faculty member who experiences or witnesses' behaviour that may be harassment or discrimination **must report the behaviour** to the Western's [Human Rights Office](#). Harassment and discrimination can be human rights-based, which is also known as EDI-based, (sexism, racism, transphobia, homophobia, islamophobia, xenophobia, antisemitism, and ableism) or non-human rights-based (personal harassment or workplace harassment).

12. How to Be Successful in this Class

Students enrolled in this class should understand the level of autonomy and self-discipline required to be successful.

1. Invest in a planner or application to keep track of your courses. Populate all your deadlines at the start of the term and schedule your time throughout the course.
2. Consistently attending all course sessions, including lectures and student presentations.
3. Make it a daily habit to log onto OWL Brightspace to ensure you have seen everything posted to help you succeed in this class.
4. Follow checklists created on OWL Brightspace or create your own to help you stay on track.
5. Take notes as you go through the lesson material. Keeping handwritten notes or even notes on a regular Word document will help you learn more effectively than just reading or watching the videos.
6. Connect with others. Try forming an online study group and try meeting on a weekly basis for study and peer support.
7. Do not be afraid to ask questions. If you are struggling with a topic, check the online discussion boards or contact your instructor(s) and or teaching assistant(s).
8. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.

13. Western Academic Policies/Procedures and Statements

A. Absence from Course Commitments

Medical, Compassionate, or Extenuating Circumstances

Students missing course work for medical, compassionate, or extenuating circumstances can request academic consideration by completing a request at the [Student Absence Portal](#). Students are permitted one academic consideration request per course per term **without** supporting documentation. Note that supporting documentation is **always** required for academic consideration requests for examinations

scheduled by the office of the registrar (e.g., December and April exams) and for practical laboratory and performance tests (typically scheduled during the last week of the term).

Students should also note that the instructor may **designate** one assessment per course per term that requires supporting documentation. This designated assessment is described elsewhere in this document. Academic consideration requests may be denied when flexibility in assessment has already been included. Examples of flexibility in assessment include when there are assessments not required for calculation of the final grade (e.g. 8 out of 10 quizzes) or there is flexibility in the submission timeframe (e.g. 72 hour no late penalty period).

Please note that any academic considerations granted in this course will be determined by the instructor of this course, in consultation with the academic advisors in your Faculty of Registration, in accordance with information presented in this course syllabus. Supporting documentation for academic considerations for absences due to illness should use the Student Medical Certificate or, where that is not possible, equivalent documentation by a health care practitioner.

Policy: [Academic Consideration – Undergraduate Students in First Entry Programs](#)

Procedures: [Student Medical Certificate](#)

Religious Holidays

Students should review the policy for Accommodation for Religious Holidays (Appendix 1). Where a student will be unable to write examinations and term tests due to a conflicting religious holiday, they should inform their instructors as soon as possible but not later than two weeks prior to writing the examination/term test. In the case of conflict with a midterm test, students should inform their instructor as soon as possible but not later than one week prior to the midterm.

Policy: [Accommodation for Religious Holidays](#)

Special Examinations

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. To provide an opportunity for students to recover from the circumstances resulting in a Special Examination, the University has implemented Special Examinations dates.

Policy: [Definitions of Types of Examinations](#)

B. Academic Appeals and Scholastic Offenses

Students can file a **request for relief from academic decisions** if the request is based on one or more grounds listed in the policy. Requests for relief generally fall into three categories, which are also listed in the policy. All requests for relief must be supported by evidence. A request for relief from academic decisions process was formally referred to as an appeal. Refer to the policy and procedures about further details and timelines.

https://uwo.ca/univsec/academic_policies/rights_responsibilities.html

Policy: [Requests for Relief from Academic Decisions](#)

Procedures: [Undergraduate Student Academic Requests for Relief](#)

Scholastic offences are taken seriously, and students are directed to read the appropriate policy, specifically, the definition of what constitutes a scholastic offence.

Policy: [Scholastic Offences](#)

Procedures: [Undergraduate Scholastic Offences](#)

Students may **appeal** some academic and scholastic disciplinary decisions by a Dean or their designate, to the Senate Review Board Academic (SRBA).

Policy: [Senate Review Board Academic Appeals](#)

Procedures: [Senate Review Board Academic Appeals](#)

C. Accessibility Statement

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Accessible Education (AE) at 661-2111 x 82147 for any specific question regarding an accommodation.

Policy: [Academic Accommodation for Students with Disabilities](#)

D. Correspondence Statement

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.

E. Discovery Credit Statement

Students are permitted to designate up to 1.0 Discovery Credit course (or equivalent) for pass/fail grading that can be counted toward the overall course credits required for their degree program.

Policy: [Undergraduate Course Credit](#)

Procedures: [Discovery Credits](#)

F. Statement on the Use of Generative Artificial Intelligence (AI)

Students may use generative AI tools to assist with information gathering, preliminary literature exploration, and improving the clarity of their writing. However, AI tools are intended to support, not replace, critical thinking, independent analysis, and original scholarly work. Oral presentation and presentation summary should reflect the students' own thoughts and independent written work. Any use of generative AI in the preparation of presentations, presentation summaries, assignments, or other course-related work must be clearly disclosed. Such disclosure should identify the AI tool used and describe the nature and extent of its contribution. Students remain fully responsible for the accuracy, originality, quality, and academic integrity of all submitted work. Information generated by AI tools should be critically evaluated and verified using reliable academic sources.

Course instructors' statement: All course materials have been developed, reviewed, and approved by the course instructors. A small number of figures and graphical illustrations included in the teaching slides were created with the assistance of the generative AI tool Microsoft 360 Copilot and subsequently adapted, verified, and labeled by the instructors where appropriate. The use of AI-generated visual content is openly disclosed. The instructors assume full responsibility for the accuracy and scientific validity of all course content, particularly with respect to physiological science. Students are encouraged to engage critically with course materials and to provide questions, comments, and constructive feedback throughout the course.

G. Turnitin and other similarity review software

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and [Turnitin.com](https://www.turnitin.com).

Policy: [Evaluation of Academic Performance](#)

14. BMSUE Academic Policies and Statements

A. Cell Phone and Electronic Device Policy (for in-person tests and exams)

The Schulich School of Medicine & Dentistry is committed to ensuring that testing and evaluation are undertaken fairly across all our departments and programs. For all tests and exams, it is the policy of the School that any electronic devices, e.g., cell phones, tablets, cameras, smart glasses, smart watch or iPod are strictly prohibited. These devices **MUST** be left either at home or with the student's bag/jacket at the front of the room and **MUST NOT** be at the test/exam desk or in the individual's pocket. Any student found with one of these prohibited devices will receive a grade of zero on the test or exam and this will be documented as a Scholastic Offence. Non-programmable calculators are only allowed when indicated by the instructor. The program is not responsible for stolen/lost or broken devices.

B. Copyright and Audio/Video Recording Statement

Course materials produced by faculty are copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws. You must always ask permission to record another individual and you should never share or distribute recordings.

C. Rounding of Marks Statement

Across the Basic Medical Sciences Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. **Final grades** in this course are rounded to the nearest whole number based on the first decimal place. For example, a grade of 74.49 or lower will be rounded to 74, whereas 74.50 or higher will be rounded to 75.

Marks **WILL NOT** be arbitrarily increased to the next grade or GPA, e.g., a 79 will **NOT** be increased to an 80, and 84 **WILL NOT** be increased to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for arbitrary mark increasing will be denied. Marks will be assigned based on assessments in the syllabus and no extra work or tasks will be assigned to increase a mark.

Course grade rounding provisions, as described above, differ from cumulative and term averages. Cumulative and term averages will be calculated to two decimal places and rounded to the nearest whole number with .45 rounded up, for the purposes of admission to and progression in modules, scholarship retention, and Dean's Honour List.

Policy: [Marks/Grades; Definitions of Grades; Grading Scale for Undergraduate Students](#)

15. Support Services

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

Statement on Gender-Based and Sexual Violence

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 the following website:

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.

Other important links:

- [Academic Advising \(Science and Basic Medical Sciences\)](#)
- [Learning Development and Success](#)
- [Office of the Registrar](#)
- [Wellness & Wellbeing](#)
- [Western USC Services](#)

Appendix 1: Western University Academic Policies and Procedures

The policies and procedures listed in this syllabus are outlined in the table below. In some cases, a policy does not include an accompanied procedures document.

Academic Policy	Name of Policy/Procedure	Links
General Policy	Marks/Grades; Definitions of Grades; Grading Scale for Undergraduate Students	Policy
General Policy	Structure of the Academic Year	Policy
Registration, Progression, Graduation	Course Numbering Policy, Essay Courses, and Hours of Instruction	Policy
Registration, Progression, Graduation	Undergraduate Course Credit	Policy • Procedures
Examinations	Definitions of Types of Examinations	Policy
Examinations	Evaluation of Academic Performance	Policy
Examinations	Examination Conflicts	Policy
Rights and Responsibilities	Academic Accommodation for Students with Disabilities	Policy
Rights and Responsibilities	Accommodation for Religious Holidays	Policy
Rights and Responsibilities	Policy on Academic Consideration – Undergraduate Students in First Entry Programs	Policy • Procedures
Rights and Responsibilities	Requests for Relief from Academic Decisions (Undergraduate)	Policy • Procedures
Rights and Responsibilities	Requests for Relief from Academic Decisions (Graduate)	Policy • Procedures
Rights and Responsibilities	Scholastic Offences (Undergraduate)	Policy • Procedures
Rights and Responsibilities	Senate Review Board Academic Appeals	Policy • Procedures