

Physiology and Pharmacology/Physiology and Pharmacology

Animal and cell modeling of development and disease

PHYSPHARM 4440B

Course outline for Winter 2022



Although this academic year might be different, Western University is committed to a **thriving campus**. We encourage you to check out the [Digital Student Experience](#) website to manage your academics and well-being. Additionally, the following link provides available resources to support students on and off campus: <https://www.uwo.ca/health/>.

1. Technical Requirements (if joining the available stream):



Stable internet connection



Laptop or computer



Working microphone



Working webcam

2. Course Overview and Important Dates:

Delivery Mode	Dates	Time
In person and online	Thursdays	12:30-2:20

*Details about design and delivery of the course are listed below in Section 4

This course examines the use of established and emerging cell and animal models to study developmental and disease processes. From transgenic mice, to CRISPR-Cas9, to rapid screening of drugs for pharmaceutical testing, the understanding of how model systems can be utilized to evaluate normal development and physiology as well as pathologies.

3. Contact Information

Course Coordinator	Contact Information
Christopher Pin	cpin@uwo.ca

Instructor(s) or Teaching Assistant(s)	Contact Information
Dean Betts	dean.betts@schulich.uwo.ca
Tom Drysdale	tadrylda@uwo.ca

4. Course Description and Design

Course Objectives:

The main objective of this course is to introduce students to the development and characterization of preclinical models used in physiology and disease-based research. Sessions will focus on improving the ability of students to read, understand, and discuss primary scientific literature, and provide students with an opportunity to conceptually translate their knowledge on model development to solve problems/answer questions related to physiology and pharmacology. The course material will include pre-recorded videos, didactic lecturing, analysis of primary research journal articles and class presentations/discussions. **Students are expected to come prepared to work in groups and discuss, in class, the content of pre-recorded videos and journal articles provided. This will require independent work outside of the lectures.** The lectures will focus mainly on how preclinical models are developed and used for understanding fundamental developmental, physiological, and pathological processes (see schedule).

Mode	Dates	Time	Frequency
In class, University Community Centre Room 66 (UCC66)	Thursday; 12:30-2:20 pm	2 hours	weekly
Virtual asynchronous information will be provided	weekly	15 minutes	weekly

- Asynchronous pre-work must be completed prior to in class sessions
- Attendance at in class sessions is required

All course material will be posted to OWL: <http://owl.uwo.ca>. Any changes will be indicated on the OWL site and discussed with the class.

If students need assistance, 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.

[Google Chrome](#) or [Mozilla Firefox](#) are the preferred browsers to optimally use OWL; update your browsers frequently. Students interested in evaluating their internet speed, please click [here](#).

5. Learning Outcomes

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

- understand various pre-clinical models used in research and therapeutics
- identify the various techniques/technologies utilized to study tissue/organ development and correctly apply these techniques to address specific hypotheses
- identify research goals and hypotheses within a scientific publication
- create testable models and hypotheses and design appropriate, controlled experiments to test these hypotheses
- work in a small group to critically discuss primary research publications

6. Course Content and Schedule

Week	Dates	Topic	Instructor
1	January 13 th	Introduction to course and animal/cell models	C. Pin
2	January 20 th	Mouse knockouts and tissue development <i>Description of figure analysis</i>	C. Pin
3	January 27 th	Inducible mouse knockouts and disease susceptibility	C. Pin
4	February 3 rd	Maternal knockout models in mice	D. Betts
5	February 10 th	Non-mammalian animal models <i>Developing a novel animal model</i>	T. Drysdale
6	February 17 th	Genetic manipulation in non-mammalian models	T. Drysdale
7	February 24 th	Reading Week	T. Drysdale
8	March 3 rd	Experimental methods in non-mammalian models	N/A
9	March 10 th	Systems biology in non-mammalian models	T. Drysdale
10	March 17 th	Development of stem cell models <i>Developing a novel animal model</i>	D. Betts
11	March 24 th	iPS cell modelling to understand disease	D. Betts
12	March 31 st	The use of iPS cells for rapid drug screening	D. Betts
13	April 7 th	Organoid development from tumours	C. Pin

Presentation #1 (Assignment 1); presentation#2 (Assignment 2)

7. Online Participation and Engagement

Currently, the expectation is that lectures will be online until the end of January 2022 and then shifting to in person beginning in February. If we need to continue online learning, sessions will still be held synchronously. At times, students will be required to work together in small groups, and this group work will still occur. If lectures remain online, then **the expectations regarding student participation and engagement will still be applied**. All students are expected to:

- participate and engage with content as much as possible
- participate during in class sessions via audio and chat features and be able to share their screen for participation purposes
- Students should participate by interacting in the forums with their peers and instructors

8. Evaluation

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

Assessment	Format	Weighting	Due Date
Presentation #1 (Figure description)	Oral (in class)	10%	Presentation dates highlighted in yellow
Presentation #2 (Next experiment)	Oral (in class)	15%	Presentation dates highlighted in green
Create a novel animal/cell model with experiments to answer a specific question (Assignment #3)	Written	25%	Early April
Final exam	Essay/short answers	40%	During exam period
Participation	Combination of asking and answering questions and completing online content	10%	

- Written assignment is due at 11:55 pm EST unless otherwise specified
- Written assignment will be submitted to Turnitin (statement in policies below)
- Students will have unlimited submissions to Turnitin
- Rubrics will be used to evaluate assessments and will be posted with the instructions
- After an assessment is returned, students should wait 24 hours to digest feedback before contacting their evaluator; to ensure a timely response, reach out within 7 days

Short description of evaluations

Presentation #1 – Figure Description: Students will work in groups and provide a PowerPoint presentation that describes several figures from a primary literature article provided by the faculty. Each student will present a single figure (5–10-minute description/figure) and answer questions from other students and Faculty.

Presentation #2 – Next Experiment: Students will work in groups and provide a single PowerPoint presentation (20 minutes) that describes an animal or cell-based model that extends the information from a primary literature article provided by the faculty. Students will answer questions from other students and Faculty (10 minutes).

Written Assignment (Assignment #3) - Create a novel animal/cell model: Students will choose from a series of papers provided by the faculty that identify genetic mutations found within humans. These mutations may be linked to a genetic disorder or disease and the student will be asked to design a cell or animal model that can be used to determine the functional relevance of the gene as it relates to specific physiological or pathological outcomes.

Final Exam: Short and long style essay questions that will test the student's ability to expand upon the information given in the lectures. Exam questions will typically ask students to suggest experiments and provide results that pertain to models or hypotheses discussed in the lectures.

Participation: Students will be required to participate in the course through asking/answering questions in the context of student presentations or during lectures. They will also be required to contribute to online forums provided on the OWL website and complete short online reflections indicating what is clear and unclear within the pre-lecture recordings.

Click [here](#) for a detailed and comprehensive set of policies and regulations concerning examinations and grading. 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 evaluations:

- Late assessments without self-reported absences will be subject to a late penalty 10%/day
- Late assessments with self-reported absences should be submitted within 24 hours of the end of the 48-hour period
- An assessment cannot be submitted after it has been returned to the class; [an alternate assessment will be assigned] OR [the weight will be transferred to the final grade]
- A make-up exam will be offered
- If a make-up assessment is missed, the student will receive an INC and complete the task the next time the course is offered

9. Communication:

- Students should check the OWL site every 24 – 48 hours
- A weekly update will be provided on the OWL announcements
- Students should email their instructor(s) and teaching assistant(s) using provided emails or OWL “messages”
- Emails will be monitored daily; students will receive a response in 24 – 48 hours depending on the weekend
- This course will use Zoom for discussions
- This course will use the OWL forum for discussions
- Students should post all course-related content on the discussion forum so that everyone can access answers to questions
- The discussion forums will be monitored daily by instructors or teaching assistants

10. Office Hours:

There are traditionally no office hours offered. However, students should contact professors directly to book an appointment which can occur via zoom or in person.

11. Resources

- All resources will be posted in OWL
- No required textbook but primary literature will need to be accessed

12. Professionalism & Privacy:

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

- Students are expected to follow online etiquette expectations provided on OWL
- All course materials created by the instructor(s) are copyrighted and cannot be sold/shared
- Recordings are not permitted (audio or video) without explicit permission
- Permitted recordings are not to be distributed
- All recorded sessions will remain within the course site or unlisted if streamed

13. 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 time at the start of each week to get organized and manage your time.
2. Make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
3. Follow weekly checklists created on OWL or create your own to help you stay on track.
4. 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.
5. Connect with others. Try forming an online study group and try meeting on a weekly basis for study and peer support.
6. 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).
7. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.

14. Western Academic Policies and Statements

Absence from Course Commitments

[Policy on Academic Consideration for Student Absences](#)

If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a **self-reported absence** or via the **Academic Counselling** unit. Students have two self-reports to use throughout the academic year; absence from course commitments including tests, quizzes, presentations, labs, and assignments that are worth 30% or less can be self-reported. Self-reported absences cover a

student for 48 hours (yesterday + today or today + tomorrow). Your instructor will receive notification of your consideration; however, you should contact your instructor immediately regarding your absence. Students are expected to submit missed work within 24 hours of the end of the 48-hour period. Please review details of the [university's policy on academic consideration for student absences](#).

If you have used both their self-reported absences or will miss more than 48 hours of course requirements, a Student Medical Certificate (SMC) should be signed by a licensed medical or mental health practitioner and you should contact academic counselling. Academic Counselling will be operating virtually this year and can be contacted at scibmsac@uwo.ca.

Accommodation for Religious Holidays

The policy on Accommodation for Religious Holidays can be viewed [here](#).

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. These dates as well as other important information about examinations and academic standing can be found [here](#).

Academic Offences

"Scholastic offences are taken seriously, and students are directed [here](#) to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

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 or review [The policy on Accommodation for Students with Disabilities](#).

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. You can read about the privacy and security of the UWO email accounts [here](#).

Turnitin and other similarity review software

All assignments will be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. Students will be able to view their results before the final submission. 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.

15. BMSUE Academic Policies and Statements

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, i.e., cell phones, tablets, cameras, 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. Non-programmable calculators are only allowed when indicated by the instructor. The program is not responsible for stolen/lost or broken devices.

Copyright and Audio/Video Recording Statement

Course material produced by faculty is 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.

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** on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. Marks **WILL NOT** be bumped to the next grade or GPA, e.g. a 79 will **NOT** be bumped up to an 80, an 84 **WILL NOT** be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark "bumping" will be denied.

16. Support Services

The following links provide information about support services at Western University.

[Academic Counselling \(Science and Basic Medical Sciences\)](#)

[Appeal Procedures](#)

[Registrarial Services](#)

[Student Development Services](#)

[Student Health Services](#)