



Department of Medical Biophysics Advanced Molecular Imaging; MEDBIO 4518/9518b

Course Syllabus for Winter 2024



Western University is committed to a **thriving campus**; therefore, your health and wellness matter to us! The following link provides information about the resources available on and off campus to support students: <u>https://www.uwo.ca/health/</u> Your course coordinator can also **guide you** to resources and/or services should you need them.

Classes End

TBD

1. Important Dates:

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Classes Begin			Classes Ellu	
	* March 7, 2023: Last day to drop a s	second-term half course with	put penalty	
	Reading Week	Study day(s)	Exam Period	

TBD

Classes Bogin

February 19-23

2. Contact Information

Course Coordinator	Contact Information
Instructor(s) or Teaching Assistant(s)	Contact Information

3. Course Description and Design

Delivery Mode: This course is intended to be delivered live (in person).



This course will discuss the role of diagnostic imaging in detecting molecules, genes, and cells in vivo. Emphasis will be in how these techniques can help study molecular mechanisms of disease *in vivo*. Topics include DNA/protein synthesis, transgenic mice, novel contrast agents and small animal imaging. Students will be evaluated based on an oral presentation of a journal article and a written literature review.

Prerequisite(s): Introduction to Molecular Imaging 3518B, for undergraduate students.

Timetabled Sessions

Component	Date(s)	Time
Lectures		

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 <u>OWL Help page</u>. Alternatively, they can contact the <u>Western Technology Services Helpdesk</u>. They can be contacted by phone at 519-661-3800 or ext. 83800.

<u>Google Chrome</u> or <u>Mozilla Firefox</u> are the preferred browsers to optimally use OWL; update your browsers frequently. Students interested in evaluating their internet speed, please click <u>here.</u>

4. Learning Outcomes

GOALS:

At the end of this course, students will:

1. Understand how different imaging modalities can be used to examine molecular and cellular processes.

2. Will be able to apply this knowledge to mechanisms of disease progression and therapy.



OBJECTIVES:

Students will demonstrate their mastery of the course content by:

- 1. Defining the concept of "molecular imaging."
- 2. Understanding standard methods and models in molecular and cell biology

3. Understanding how imaging modalities are adapting to image genes, molecules and cells.

4. Combining their knowledge of imaging with methods in molecular and cell biology.

5. Applying concepts of molecular imaging to examining molecular mechanisms of disease, such as cancer, cardiovascular disease, diabetes, and neurological disorders.

6. Critically evaluating the current literature on molecular imaging.

7. Predicting how molecular imaging will advance the understanding of both normal physiology and disease progression, from both scientific and clinical perspectives.

5. Course Content and Schedule

Week	Торіс
Jan 8	mRNA translation
Jan 10	Techniques in molecular biology I
Jan 15	Techniques in molecular biology II

Jan 17	DNA minicircles for imaging
Jan 22	Genomics
Jan 24	miRNA
Jan 29	Imaging gene silencing by noncoding RNAs
Jan 31	Imaging cellular compartments and transport
Feb 5	Transgenics
Feb 7	Homologous recombination and stem cells
Feb 12	Ultrasound imaging of acoustic sensor genes
Feb 14	Ultrasound imaging of acoustic sensor genes
Feb 26	Cellular and molecular imaging with MRI
Feb 28	Probe Development
Mar 4	PET instrumentation
Mar 6	PET/MRI
Mar 11	SPECT/PET isotopes
Mar 13	Magnetic particle imaging
Mar 18	Microscopy basics
Mar 20	Intravital microscopy
Mar 25	Optics: super-resolution microscopy
Mar 27	Optics: image quantification in deep tissue
April 10	Oral Presentations

6. Participation and Engagement

Students are expected to participate and engage with content as much as possible, participation is graded.

7. Evaluation

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

For 4518B students:

- (i) Written assignment (30%) due Monday March 11, 2024, based on critical analysis of a scientific article on molecular imaging study, details to follow
- (ii) Final paper (50%) due Friday April 19, 2024, write a review paper on a topic in cellular or molecular imaging
- (iii) Participation (20%)

For 9518B students:

- (i) Oral presentation (40%) due Wednesday April 10, 2024, choose a research article to present, to be approved by course coordinator
- (ii) Final paper (40%) due Friday April 19, 2024, write a review paper on a topic in cellular or molecular imaging, details to be provided
- (iii) Participation (20%)

Click <u>here</u> for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

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

8. Communication:

- Students should check the OWL site every 24–48 hours
- Students should email the Course Director using email addresses provided above
- Emails will be monitored daily; students will receive a response in 24–48 hours



9. Office Hours:



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Most office hours will be by email request followed by Zoom discussions or in-person sessions

10. Resources



- All resources will be posted in OWL
- No required textbook
- No required study guide

11. Professionalism & Privacy:

Western students are expected to follow the <u>Student Code of Conduct</u>. 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 (e.g., Must Knows Facebook group, Course Hero, Chegg, etc.)
- Recordings are not permitted (audio or video) without explicit permission
- Permitted recordings are not to be distributed
- Students will be expected to take an academic integrity pledge before some assessments

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 <u>Non-Discrimination/Harassment Policy</u> (M.A.P.P. 1.35) and <u>Non-Discrimination/Harassment Policy</u> – 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 <u>Human Rights Office</u>. 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. 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.



13. Western Academic Policies and Statements

Absence from Course Commitments

A. Absence for medical illness:

Students must familiarize themselves with the Accommodation for Illness Policy.

A student seeking academic accommodation 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. Instructors will use good judgment and ensure fair treatment for all students when considering these requests. You are not required to disclose details about your situation to your instructor; documentation is not required in this situation, and you should not send any pictures to your instructor.

If you are unable to meet a course requirement for any **work worth 10% or greater** due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Academic Counseling as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. Please note that the format of a make-up test, exam, or assignment is at the discretion of the course coordinator.

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Health Services. Office) for visits to Student The form can be found at: http://www.uwo.ca/univsec/pdf/academic policies/appeals/medicalform.pdf

B. Absence for non-medical reasons:

Student absences might also be approved for non-medical reasons such as religious holidays and compassionate situations. Please review the policy on <u>Accommodation for Religious Holidays</u>. All non-medical requests must be processed by Academic Counselling. Not all absences will be approved; pay attention to the academic calendar and final exam period when booking any trips.

Academic Offenses

Scholastic offences are taken seriously, and students are directed <u>here</u> 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 <u>The policy on Accommodation for Students with Disabilities</u>

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 <u>here</u>.

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. The details of this policy and the deadlines can be found <u>here</u>.

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. 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 <u>Turnitin.com</u>.

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.

14. 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