

MEDICAL BIOPHYSICS MEDBIO 4700A

Course Outline for Fall 2025

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:



Reliable internet connection



Laptop or computer

2. Important Dates:

Classes Begin	Reading Week	Classes End	Study day(s)	Exam Period
September 4	November 3–9	December 9	December 10	December 11–22

September 30, 2025: National Day for Truth and Reconciliation; non-instructional day

September 12, 2025: Last day to add or drop a Fall 12-week course

December 1, 2025: Last day to withdraw from a Fall 12-week course without academic penalty

3. Contact Information

Course Coordinator	Contact Information

Instructors (in order)	Contact Information

Teaching Assistant	Contact Information

4. Course Description and Design

Delivery Mode: in-person

Course Summary

Case studies will highlight specific issues that medical biophysics covers while introducing important concepts and the multidisciplinary nature of research, professionals and applications in the field. The key themes are cardiovascular and circulatory health, molecular imaging for research, diagnostic imaging in humans, cancer radiotherapy, and medical image processing.

Prerequisites

Prerequisite(s): Registration in Year 4 of an Honors degree that contains a module offered by the Department of Medical Biophysics or, with special permission, registration in Year 4 of a BESC degree or an Honors BHSc, BMSc or BSc degree.

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)	Time
Lectures	Tuesday	12:30 pm – 1:30 pm
Case Studies	Thursday	11:30 am – 1:30 pm

R Asynchronous pre-work must be completed prior to sessions

R Attendance at lectures is required

R Missed work should be completed within 24 hours if given permission

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

Classroom lessons present and review fundamental background for biophysics, including mathematics, physics, chemistry, biochemistry, pharmacology, medicine, genetics, engineering and or physiology, as needed to understand an important concept or theme in medical biophysics.

Basic and clinical research, clinical service, and other applied uses of medical biophysics are considered in the context of solving real life dilemmas (Case Studies). Class discussions are facilitated by instructors. Each Case Study illustrates an important concept or theme in medical biophysics.

The first part of each series of weekly lessons is weighted heavily on introducing foundational concepts, which may be a review for some and new for other students. This is necessary for establishing a common baseline and refresher that allows for discussions later in the week course.

The Case Studies are designed for students to apply their knowledge to come up with reasonable and viable solutions.

Instructors will moderate discussion and debate, provide expert opinion/testimony and provide a case debrief when completed.

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

- Generate hypotheses to test solutions for problems encountered in biophysics.
- Analyse and present Case studies in medical biophysics
- Design a plan that leads to recommendations on the course of action to take to address dilemmas from a variety of disciplinary fields and outlooks
- Explain foundational knowledge of experimental tools (e.g. MRI, CT, and Optical Imaging used to image biophysical, biochemical, and physiological processes in research and/or the clinic).
- Express evidence-based opinions in disciplinary discussions and reports
- Critically appraise the literature.
- Express evidence-based opinions in disciplinary discussions and reports.
- Work effectively in a team, to solve problems or to work with others toward a shared/academic goal as team member or team lead when appropriate.

6. Course Content and Schedule

Week	Dates	Topic	Instructor
1	Sept 4	Course introduction	
2	Sept 9 & 11	Diagnosing and treating prostate cancer	
3	Sept 16 & 18	Positron emission tomography	
4	Sept 23 & 25	Physiology of pain and its quantification	
5	Sept 30* & Oct 2	Treating atrial fibrillation	
6	Oct 7 & 9	Vaping and pulmonary disease	
7	Oct 14 & 16	Measuring treatment response in brain cancer	
8	Oct 21 & 23	Using 3D ultrasound for diagnosis of disease	
9	Oct 28 & 30	Measuring perfusion in the brain	
10	Nov 3–9	Reading Week (starts November 3 rd 12:01 AM)	
11	Nov 11 & 13	Measuring neurovascular response	
12	Nov 18 & 20	Musculoskeletal Imaging and Biomechanics	
13	Nov 25 & 27	Group case study presentations†	Groups 1, 2 & 3
14	Dec 2 & 4	Group case study presentations†	Groups 3 & 4
15	Dec 9	No class	

* Truth and Reconciliation Day. No instruction. Lecture will be pre-recorded.

† Student attendance is required for the final group case study presentations. Participation in this course component comprises 35% of the final mark. It cannot be rescheduled, and no makeup assessment can be substituted. Failure to attend and participate in the presentation will result in an INC.

7. Participation and Engagement

*R*Students are expected to participate and engage with content as much as possible during lectures and case studies.

*R*Students are expected to participate by interacting with their peers and instructors for preparation of their final case study and must attend the final presentation.

8. Assessment and Evaluation

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

Assessment	Format	Weighting	Due Date	Flexibility
Case study lectures by instructors	Assignments	18%	Weeks 2 - 11	Drop lowest 1 (best 8 of 9 assignments)
	Class attendance and participation assigned by TA	27%	Weeks 1 - 11	None (no participation marks if not present)
Group case study preparation meetings with instructor	Group participation marks assigned by instructor	15%	Weeks 3, 5, 8, 11	None (no participation marks if not present)
Group case study presentations	Class presentation by student groups assessed by instructor(s) and TA	35% group presentation 5% audience participation	Weeks 12 - 13	None (attendance for group presentation is mandatory)

Designated Assessment: Instructors are permitted to designate one assessment per course per term as requiring supporting documentation to receive academic consideration. The final Group Case Study Presentation has been designated as requiring supporting documentation; however, there is no alternate assessment for substitution if the student misses this presentation. An absent student will receive an INC.

Information about flexibility in assessment

- R* Flexibility in assessment has been applied to this course; therefore, academic consideration requests may be denied on the assessments where flexibility is included. Best 8 of 9 assignments will be included in final mark.
- R* Participation marks cannot be earned when student is absent.
- R* Students must attend and participate in the final group presentations of their case study.

General information about assessments

- R* All assignments are due at 1:30 pm EST after the lecture on the Tuesday of the following week unless otherwise specified.
- R* Students are responsible for ensuring that the correct file version is uploaded; incorrect submissions including corrupt files could be subject to late penalties (see below) or a 0.
- R* Written assignments will be submitted to Turnitin (statement in policies below).
- R* Students will have unlimited submissions to Turnitin.
- R* Rubrics will be used to evaluate assessments and will be posted with the instructions.
- R* A student might not receive the same grade as their group members if it is determined that the distribution of work was not equal.
- R* 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.
- R* Assessment re-grading could result in the mark, increasing, decreasing, or remaining the same.
- R* 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 decision of the instructor or does not receive a decision from the instructor, a written request for relief must be submitted to the Department 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:

- R* Late assessments without academic consideration will be subject to a late penalty 10%/day every 24 hours until 48 hours after the deadline. Assignments submitted after 48 hours following the assignment due date, or not at all, will receive a zero grade.
- R* There is a total of 9 assignments for this course. The best 8 of these assignments will be used for assessment. In addition to assignments, the student must participate in the final group case study presentation to pass the course. If the student misses this presentation, he or she will receive an INC and can complete the course the next time it is offered.
- R* There are no other tests, examinations, or special examinations. Students will also be assessed on class participation during weekly lectures. No participation mark is possible for absences.

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 or the student misses the makeup for the final exam for reasons approved by the Academic Advising Office, 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. Due to the pedagogy of this course, there are no examinations or special examinations.

9. Communication

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

10. Office Hours

- R* Office hours will be held in-person or remotely using Zoom.
- R* Office hours will be held by pre-arranged appointment.
- R* Office hours will be individual.

11. Course Materials

R All resources will be posted on OWL Brightspace.

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:

- R* 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.).
- R* Recordings are not permitted (audio or video) without explicit permission.
- R* Permitted recordings are not to be distributed.
- R* 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 [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).

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 your time throughout the course.
2. Make it a daily habit to log onto OWL Brightspace to ensure you have seen everything posted to help you succeed in this class.
3. Follow checklists created on OWL Brightspace 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. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.
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. Read the background material provided by the instructor prior to the lecture. Be prepared to ask and answer questions based on this instructional material during class.

14. 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 [central academic consideration 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. There are no examinations or special examinations in this course.

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.

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 Electronic Devices

Electronic devices such as laptops or smart phones are permitted during the lectures and for presentations.

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

Within this course, students are permitted to use AI tools exclusively for information gathering and preliminary research purposes. These tools are intended to enhance the learning experience by providing access to diverse information sources. However, it is essential that students critically evaluate the obtained information, exercise independent thinking, and engage in original research to synthesize and develop their own ideas, arguments, and perspectives. The use of AI tools can serve as a starting point for exploration, with students expected to uphold academic integrity by appropriately attributing all sources and avoiding plagiarism. Assignments and reports should reflect the students' own thoughts and independent written work. By adhering to these guidelines, students contribute to a responsible and ethical learning environment that promotes critical thinking, independent inquiry and allows them to produce original written contributions.

H. 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).

15. 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](#)

16. 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