

*** DRAFT *** MEDICAL BIOPHYSICS
MEDBIO 4700B

Case Studies in Medical Biophysics

Course outline for Winter 2024

1. Technical Requirements:



Stable internet connection



Laptop or computer



Working microphone



Working webcam

Please Note: Due to uncertainty around COVID-19, students must have a reliable internet connection and computer that are compatible with online learning and testing system requirements. Please see Section 12 to review Western's policies.

Computer requirements include:

- Operating system: MAC: OSX Yosemite 10.10.5 or higher, PC: Windows 7, 8, or higher
- Processor/Ram: MAC: Intel / AMD Processor, 2 GB RAM, PC: Dual-core 2.4 Ghz CPU, 2 GB RAM or better
- Web Browsers: Mozilla Firefox v20.0 or Higher Google Chrome v25.0 or higher
- Plug-ins: Javascript Enabled & Third Party Cookies Enabled
- Camera resolution: 800 x 600 resolution or better
- Internet connection: Cable Modem, DSL or better (300 kbps download, 250 kbps upload)

2. Course Overview and Important Dates:



Delivery Mode	Dates	Location
In person classroom	See Student Centre	See Student Centre

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

Classes Begin	Reading Weeks	Classes End	Study day(s)	Exam Period
January 9	Feb 17-25	April 6	No exam	No exam

*March 7, 2024: Last day to drop a second-term half (0.5) course without academic penalty.

3. Contact Information



This information is limited to persons having Western University credentials with permission to access Western University’s academic service portals.

4. Course Description and Design

Delivery Mode: in-person on campus

Course summary

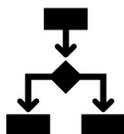
Case studies will highlight specific issues that medical biophysics covers while introducing important concepts and the multidisciplinary nature of research, professionals, and applications in the field. The key themes are cardiovascular and circulatory health, molecular imaging for research, diagnostic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

Prerequisite checking – the student’s responsibility

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.



Course Weight: 0.5

Breadth: Category C

Subject code: MEDBIO

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 Student Accessibility Services at 519-661-2147 for any specific question regarding an accommodation.

Timetabled Sessions

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3 h classroom lessons per week.

- Asynchronous pre-work must be completed prior to in person Lessons
- Attendance at scheduled classroom lessons is mandatory

- Students have access to all course materials, assignments, exams, and tutorials through 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.
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NOTE: In the event of a COVID-19 resurgence during the course that necessitates moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining assessments will be conducted online at the discretion of the instructor.

5. Course Syllabus

Teaching Rationale

Online asynchronous and synchronous/in-person 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.

Students consider basic and clinical research, clinical service, and other applied uses of medical biophysics solve real life dilemmas (Case Studies). Instructors direct and facilitate discussions. Each Case Study illustrates an important concept or theme in medical biophysics.

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



Students apply their knowledge to come up with reasonable and viable solutions for instructor-designed Case Studies.

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

Students are encouraged to ask questions to learn about any course material covered in lessons throughout the term.

Students are expected to become familiar with all required course readings and course materials posted on OWL, review all lessons, attend and engage constructively in all scheduled classes and meetings, complete all assignments, and presentations. Students are encouraged to become familiar with recommended reading lists.

Case study is an experiential learning method that requires active participation and engagement in group discussions and activities. Instructors will regularly evaluate engagement. Attendance at all scheduled lessons as well as Group Case Study preparation meetings, and all Group final presentations are mandatory i.e. to have demonstrated full participation in the course.

The culmination of the learning using the case-study method will be the student group-facilitated presentation of an assigned Case. Students will engage regularly with an expert in the field in order to prepare for this case presentation.

Written assignments, oral questions and answers discussions will assess foundational knowledge and practice Case study learning methods throughout the course.

Course Learning Outcomes

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	Topics	
1	Introduction to course and meet the students and instructors	'How to case study' and 'How to participate'
2	Blood pressure	Blood pressure case
3	Circulating Biomarkers	Case: Application of biomarkers in human CVD
4	Control of Vascular Resistance	Case: peripheral vascular disease
5	To be announced	To be announced
6	PET imaging	Case: Imaging inflammatory markers in small animal research
7	Lung Ventilation-Perfusion	Case: TBA
8	Reading Week	
9	Radiation therapy: dose and fractionation	Case: Radiation trade-offs for risk versus benefits
10	Dynamic Contrast Enhanced Magnetic Resonance Imaging (DCE-MRI) of Breast Cancer	Case: Monitoring breast cancer treatment response with DCE-MRI
11	To be announced	To be announced



12	Classroom available for rehearsals and meetings	Classroom available for rehearsals and meetings
13	Presentations of Case selected by students or assigned by faculty.	

7. Evaluation

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Assessment	Methods	Due Dates	Grade Weight (%)
Case Study Weeks 1 to 11	Assignments	Weeks 2 to 11	18
	Engagement and participation (includes attendance) in weekly lessons, classes, and student group presentations. Includes in-person campus, Zoom and Forums. Best 8 of 9 assignments.	Weeks 1 to 11	32
Student Group Case prep meetings	By assigned Case instructor(s)	Weeks 3, 5, 8, 12	15
Student Group Case Study Presentation	Presentations by groups (includes preparation of written materials and slides) and discussions	Weeks 12, 13 (subject to change)	35

Access to full copy of the official Course syllabus is limited to persons having Western University credentials with permission to access Western University's academic service portals.