Medical Biophysics
MEDBIO 2500A: Introduction to Biophysics for Advancing Medicine

Course outline for Fall 2021

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:

   - Stable internet connection
   - Laptop or computer

2. Important Dates:

<table>
<thead>
<tr>
<th>Classes Begin</th>
<th>Classes End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday, September 8, 2021</td>
<td>Wednesday, December 8, 2021</td>
</tr>
</tbody>
</table>

* November 12, 2021: Last day to drop a first-term half course without academic penalty

<table>
<thead>
<tr>
<th>Reading Week</th>
<th>Study day(s)</th>
<th>Exam Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 1–7</td>
<td>December 9</td>
<td>December 10–21</td>
</tr>
</tbody>
</table>

3. Contact Information

<table>
<thead>
<tr>
<th>Course Coordinator</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charles McKenzie</td>
<td>OWL messages</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instructor(s) or Teaching Assistant(s)</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donna Goldhawk (Instructor)</td>
<td>OWL messages</td>
</tr>
<tr>
<td>Alicia Cronin (TA)</td>
<td>OWL messages</td>
</tr>
</tbody>
</table>
4. Course Description and Design

Delivery Mode: blended

An introduction to the discipline of Medical Biophysics is developed through lectures on key introductory concepts and techniques used in Medical Biophysics research. Research areas include magnetic resonance imaging, molecular imaging, microvascular oxygen transport, and cancer radiation therapy.

Timetabled Sessions

<table>
<thead>
<tr>
<th>Component</th>
<th>Date(s)</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>W</td>
<td>2:30-3:20</td>
<td>Physics &amp; Astronomy 117</td>
</tr>
</tbody>
</table>

- Asynchronous pre-work must be completed prior to sessions
- Attendance at sessions is required
- Closed captioning will be provided on audio or video recordings

All course material will be posted to OWL: [http://owl.uwo.ca](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.

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 also be conducted online at the discretion of the instructor.

5. Learning Outcomes

In this course, students will develop an understanding of the discipline of Medical Biophysics and the different kinds of research undertaken within Medical Biophysics. This understanding will be developed through a combination of lectures on key introductory concepts and techniques used in Medical Biophysics research and real-world research seminars given by Medical Biophysics faculty members. After the completion of this course, students will be able to:

1. Understand the different potential career paths in science and medicine stemming from undergraduate studies in Medical Biophysics.
2. Describe the steps involved in acquiring data for different types of Medical Biophysics research projects.
3. Compare different Medical Biophysics research techniques and tools, and determine which techniques are best in specified situations.
4. Implement simplified physical laws to solve problems in Medical Biophysics.
6. Course Content and Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sept 8–12</td>
<td>Course Introduction</td>
<td>McKenzie, Goldhawk</td>
</tr>
<tr>
<td>2</td>
<td>Sept 13–19</td>
<td>Unit 1 - X-Ray/CT &amp; Ultrasound</td>
<td>McKenzie</td>
</tr>
<tr>
<td>3</td>
<td>Sept 20–26</td>
<td><strong>Quiz 1(X-Ray/CT&amp;US)</strong></td>
<td>McKenzie</td>
</tr>
<tr>
<td>4</td>
<td>Sept 27–October 3</td>
<td>Unit 2 - MRI</td>
<td>McKenzie</td>
</tr>
<tr>
<td>5</td>
<td>Oct 4–10</td>
<td><strong>Quiz 2(MRI)</strong></td>
<td>Image Guided Intervention (IGI)</td>
</tr>
<tr>
<td>6</td>
<td>Oct 11–17</td>
<td>Unit 3 - PET &amp; Molecular Imaging</td>
<td>Goldhawk</td>
</tr>
<tr>
<td>7</td>
<td>Oct 18–24</td>
<td>Unit 3 - Molecular Imaging &amp; PET</td>
<td>Goldhawk</td>
</tr>
<tr>
<td>8</td>
<td>Oct 25–Oct 31</td>
<td><strong>Quiz 3(MI &amp; PET)</strong></td>
<td>Goldhawk</td>
</tr>
<tr>
<td>9</td>
<td>Nov 1–7</td>
<td>Reading Week</td>
<td>N/A</td>
</tr>
<tr>
<td>10</td>
<td>Nov 8–14</td>
<td>Unit 4 - Cancer</td>
<td>Goldhawk</td>
</tr>
<tr>
<td>11</td>
<td>Nov 15–21</td>
<td><strong>Quiz 4 (Cancer)</strong></td>
<td>Goldhawk</td>
</tr>
<tr>
<td>12</td>
<td>Nov 22–28</td>
<td>Unit 5 - Diffusion</td>
<td>McKenzie</td>
</tr>
<tr>
<td>13</td>
<td>Nov 29–December 5</td>
<td>Unit 6 - Image Guided Intervention (IGI)</td>
<td>McKenzie</td>
</tr>
<tr>
<td>14</td>
<td>Dec 6–8</td>
<td>Make up Quiz (If necessary)</td>
<td>McKenzie/Goldhawk</td>
</tr>
</tbody>
</table>

7. Participation and Engagement

✓ Students are expected to participate and engage with content as much as possible
✓ Students can participate during in-class sessions and post on OWL forums after watching recorded lecture content
✓ Students can also 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.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Format</th>
<th>Weighting</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>In Class Quiz</td>
<td>16.7%</td>
<td>Sept 22, 2021</td>
</tr>
<tr>
<td>Unit 2</td>
<td>In Class Quiz</td>
<td>16.7%</td>
<td>Oct 6, 2021</td>
</tr>
<tr>
<td>Unit 3</td>
<td>In Class Quiz</td>
<td>16.7%</td>
<td>Oct 27, 2021</td>
</tr>
<tr>
<td>Unit 4</td>
<td>In Class Quiz</td>
<td>16.7%</td>
<td>Nov 17, 2021</td>
</tr>
<tr>
<td>Unit 5</td>
<td>Final Exam</td>
<td>16.7%</td>
<td>TBD</td>
</tr>
<tr>
<td>Unit 6</td>
<td>Final Exam</td>
<td>16.7%</td>
<td>TBD</td>
</tr>
</tbody>
</table>

- Evaluation will be through a series of Quizzes, one per unit.
  - Quizzes for the first 4 units will be written in class.
  - Units 5, and 6 will be evaluated during the final exam. The final exam will consist of two quizzes similar in format and length to the in-class quizzes for Units 1-4.
- Each unit will have a set of Practice Questions available through OWL. These assessments will consist of questions similar to those that will be contained in each Quiz. Therefore, students should complete these formative assessments when preparing for the Quizzes.

- 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.

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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>90-100</td>
<td>One could scarcely expect better from a student at this level</td>
</tr>
<tr>
<td>A</td>
<td>80-89</td>
<td>Superior work which is clearly above average</td>
</tr>
<tr>
<td>B</td>
<td>70-79</td>
<td>Good work, meeting all requirements, and eminently satisfactory</td>
</tr>
<tr>
<td>C</td>
<td>60-69</td>
<td>Competent work, meeting requirements</td>
</tr>
<tr>
<td>D</td>
<td>50-59</td>
<td>Fair work, minimally acceptable</td>
</tr>
<tr>
<td>F</td>
<td>below 50</td>
<td>Fail</td>
</tr>
</tbody>
</table>

Information about late or missed evaluations:

- A missed quiz will be made up on December 8 with an in-class quiz on the missed unit. A student that misses more than one Quiz should contact the course Coordinator (Prof McKenzie) as soon as possible to make arrangements to make up the missed quiz(es).
9. Communication:

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

10. Office Hours:

☑ Office hours will be held remotely using Zoom.
☑ Office hours will be held from 2:30-3:30 PM on Tuesdays by the TA, and Thursdays by the Instructor responsible for the current Unit (Profs McKenzie or Goldhawk)
☑ Office hours will be booked. Please contact the TA or Professor via OWL message before the scheduled office hour if you wish to speak to them. They will provide you with a Zoom link for your meeting.
☑ Office hours will be individual

11. Resources

☑ All resources will be posted in OWL

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:

☑ 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
☑ Students will be expected to take an academic integrity pledge before some assessments

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. Treat this course as you would a face-to-face course. 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. Land Acknowledgement

We acknowledge that Western University is located on the traditional lands of the Haudenosaunee, Lūnaapéewak and Attawandaron peoples, on lands connected with the London Township and Sombra Treaties of 1796 and the Dish with One Spoon Covenant Wampum.

With this, we/I respect the longstanding relationships that Indigenous Nations have to this land, as they are the original caretakers. We acknowledge the historical and ongoing injustices that Indigenous Peoples (First Nations, Métis and Inuit) endure in Canada. We accept responsibility as a public institution to contribute toward revealing and correcting miseducation as well as renewing respectful relationships with Indigenous communities through our teaching, research and community service.

15. 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 Offenses

“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.

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 here.

Essay Course Guidelines

The guidelines for the minimum written assignments refer to the cumulative amount of written work in a course but excludes written work in examinations. You can read about essay course guidelines here.

An essay course must normally involve total written assignments (essays or other appropriate prose composition, excluding examinations) as follows:

- Full course (1000 to 1999): at least 3000 words
- Half course (1000 to 1999): at least 1500 words
- Full course (2000 and above): at least 5000 words
- Half course (2000 and above): at least 2500 words

The structure of the essay course must be such that in order to pass the course, the student must exhibit some minimal level of competence in essay writing and the appropriate level of knowledge of the content of the course.

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.

16. 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.

17. 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