Schulich MEDICINE & DENTISTRY | Western Science

Bachelor of Medical Sciences (BMSc) Program

Medical Biophysics

Introduction to Biomedical Optics - Medical Biophysics 3645A (9645A)

Course outline for Fall 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:

Stable internet connection

Laptop or computer

2. Course Overview and Important Dates:

Delivery Mode	Dates	Time
In-person	Mondays & Wednesdays	13:30-14:30

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

Classes Start	Reading Week	Classes End	Study day(s)	Exam Period
September 12	October 31	December 8	NA	NA

*March 7, 2021: Last day to drop a second-term half course or a second-term full course without penalty

3. Contact Information

Course Coordinator	Contact Information
Prof. Jeffrey Carson	jcarson@lawsonimaging.ca

Instructors	Contact Information
Prof. Timothy Scholl	scholl@uwo.ca
Prof. Mamadou Diop	mdiop@uwo.ca
Dr. Daniel Milej	dmilej@lawsonimaging.ca

Teaching Assistants	Contact Information
Farah Kamar	fkamar@uwo.ca

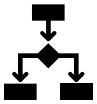
4. Course Description and Design

An introduction to the physical and biophysical principles underlying the methodology and technology for the medical uses of light including diagnostic, monitoring and therapeutic applications. Specific areas will include: instrumentation which involves light detection and analysis, light spectroscopy which involves photodynamic therapy and diffuse optical tomography and optical imaging.

Prerequisites: One of Calculus 1000A/B, Calculus 1500A/B, Numerical and Mathematical Methods 1412A/B or the former Applied Mathematics 1412A/B, plus one of Calculus 1301A/B, Calculus 1501A/B, Numerical and Mathematical Methods 1414A/B and or the former Applied Mathematics 1414A/B, or the former Applied Mathematics 1413; one of Physics 1201A/B, Physics 1401A/B, Physics 1501A/B, the former Physics 1028A/B, the former Physics 1301A/B; plus one of Physics 1202A/B, Physics 1402A/B, Physics 1502A/B, the former Physics 1029A/B, the former Physics 1302A/B. Integrated Science 1001X can be used as a prerequisite in place Calculus 1301A/B and Physics 1202A/B.

Antirequisite: none

Extra Information: 2 lecture hours, 0.5 course. Typically taken in third or fourth year, this course is also open to second-year students with an overall average of at least 75% in first year.



Senate regulation regarding the student's responsibility regarding requisites:

Note, 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. The Instructors and Course Coordinator do not resolve inquires for admission to this course. Please address any questions regarding enrollment to Prof. John McGuire, the Undergraduate Chair for Medical Biophysics: medbioundergradchair@schulich.uwo.ca

Mode (Lectures)	**Dates**	**Time**	**Frequency**
In-person	M & W	13:30 – 14:30	Twice weekly
Mode (Tutorials)	**Dates**	**Time**	**Frequency**
NA	NA	NA	NA

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.

LEARNING APPROACH:

Lecture-discussion periods: Presentation of lecture material. Class discussion (i.e. Q&A) of course material may be conducted during the weekly scheduled class times by the course instructors. Assignments are provided and graded to help students and lecturers assess progress.

5. Learning Outcomes

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

- Explain the motivation, instrumentation, methods, and practical uses of biomedical optics
- Describe the concept of light, how it is generated, transported, manipulated, detected and analyzed
- Describe light absorption and scattering by tissue
- Explain how light transport in tissue is modelled
- Understand the principle of operation of a pulse oximeter
- Understand the principle of diffuse optical spectroscopy
- Describe methods for optical imaging of tissue
- Explain the principles of optical coherence tomography and photoacoustic tomography

6. Course Content and Schedule

Month	Day	Instructor	DOW	Time	Building - Room	Events
Sept	12	Tim Scholl	M	13:30	MSB-190	
	14	Tim Scholl	W	13:30	MSB-190	
	19	Tim Scholl	M	13:30	MSB-190	
	21	Tim Scholl	W	13:30	MSB-190	
	26	Tim Scholl	M	13:30	MSB-190	
	28	Tim Scholl	W	13:30	MSB-190	
	30	Tim Scholl	F			Assignment #1 Due
Oct	3	Mamadou Diop	M	13:30	MSB-190	
	5	Mamadou Diop	W	13:30	MSB-190	
	10	Thanksgiving Holiday - No class				
	12	Tim Scholl	W	13:30	MSB-190	In-Class test #1
	17	Mamadou Diop	M	13:30	MSB-190	
	19	Mamadou Diop	W	13:30	MSB-190	
	24	Daniel Milej	M	13:30	MSB-190	Guest lecture
	26	Mamadou Diop	W	13:30	MSB-190	
	31	Fall Reading Week - No class	M	13:30	MSB-190	
Nov	2	Fall Reading Week - No class	W	13:30	MSB-190	
	7	Mamadou Diop	M	13:30	MSB-190	
	9	Jeff Carson	W	13:30	MSB-190	
	11	Mamadou Diop	F			Assignment #2 Due
	14	Jeff Carson	M	13:30	MSB-190	
	16	Mamadou Diop	W	13:30	MSB-190	In-Class Test #2
	21	Jeff Carson	M	13:30	MSB-190	
	23	Jeff Carson	W	13:30	MSB-190	
	28	Jeff Carson	M	13:30	MSB-190	
	30	Jeff Carson	W	13:30	MSB-190	
Dec	2	Jeff Carson	F			Assignment #3 Due
	5	Jeff Carson	M	13:30	MSB-190	
	7	Jeff Carson	W	13:30	MSB-190	In-Class test #3

This course is also cross-listed with Medical Biophysics 9645A and serves as a Medical Biophysics graduate course.

7. Online Participation and Engagement

All participation and engagement will be in-person.

8. Evaluation

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

Assessment	Format	Weighting	Due Date
Assignment 1	OWL Submission	13.3%	September 30
Assignment 2	OWL Submission	13.3%	November 11
Assignment 3	OWL Submission	13.4%	December 2
In-class test 1	Written	20%	October 12
In-class test 2	Written	20%	November 16
In-class test 3	Written	20%	December 7

☒ All assignments are due at 11:55 pm EST unless otherwise specified

☒ In-class proctoring will be used during in-class tests

☒ Written assignments will be submitted to Turnitin (statement in policies below)

☒ 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.

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 assignments without illness self-reports will be subject to a late penalty 10%/day

☒ Late assignments with illness self-reports should be submitted within 24 hours of submission of the last illness self-report

☒ An assignment cannot be submitted after it has been returned to the class

☒ No make-up in-class tests will be offered. A grade of zero (0) will be recorded for the missed test.

☒ If an in-class test 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

☒ Updates will be provided on the OWL announcements from time to time

☒ Emails will be monitored daily; students will receive a response in 24 – 48 hours

10. Office Hours:

☒ Office hours will be held remotely using Zoom by appointment

☒ Students will be able to schedule appointments by email

11. Resources

☒All resources will be posted in OWL

Commented [TS1]: None of these resources are required. Will erase. Can you think of any other resources that the students might need?

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

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

☒ 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.
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

In the interest of the health and safety of students and health care providers, you are no longer required to seek a medical note for absences this term. If you are unable to meet a course requirement due to illness you should use the Illness Reporting Tool. This tool takes the place of the need to submit a medical note and the Self-Reported Absence System formally used by undergraduate students.

You are required to self-report every day that you are ill and unable to complete course commitments. Details about when you should submit missed work, the format of the missed work can be found in the Section 7. Evaluation above. Students should communicate promptly with their instructor and use this tool with integrity.

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.

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