



## Your Technical Hiring Solution

This major is an exciting and interdisciplinary science in which biological and medical problems are tackled using the techniques and concepts of physics. Many areas of biological physics have important implications for human health; examples include the probing of molecular structure in muscle by X-ray diffraction and the study of molecular dynamics in cell membranes by nuclear magnetic resonance. Medical physics provides the background for such advanced clinical tools as magnetic resonance imaging (MRI), CAT and PET scans, and many more. Courses in the Biological and Medical Physics major include Biophysics of Excitable Cells, Radioactivity and Radiation, Molecular Biophysics, and Clinical Applications of Physics, providing an excellent education for careers in clinical research and in health services.

## University of Guelph Advantage

- An international reputation for excellence in research - grants awarded to faculty have been higher than the national average for over a decade
- Five Physics/Biological & Medical Physics faculty members have been named Fellows of the Royal Society of Canada

Our co-op process responds to your needs. Employers can post, interview and hire throughout the semester and our students are available for 4 or 8 month work terms. The **Experience Guelph** hiring tool makes hiring Guelph co-op students easy!

## Student Strengths

- Excellent communication and problem-solving experience
- By their first work term, students have had 10 lab courses, 3 hours/week per course, as well as a solid foundation in biology, physics, chemistry and mathematics
- As students begin the second and third work terms, they have started to specialize in one of a number of biological areas of emphasis such as genetics, microbiology, or toxicology
- In their final work term, students will have a greater theoretical understanding of physics and biophysics and will be skilled in writing reports and summaries

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[uoguelph.ca/coop](http://uoguelph.ca/coop)

# Biological & Medical Physics Course Sequencing

YEAR	FALL (SEPT-DEC)	WINTER (JAN-APRIL)	SUMMER (MAY-AUG)
ONE	<ul style="list-style-type: none"> <li>INTRODUCTION TO MOLECULAR AND CELLULAR BIOLOGY</li> <li>GENERAL CHEMISTRY I</li> <li>PROGRAMMING</li> <li>INTEGRATED MATHEMATICS &amp; PHYSICS I <b>OR</b> PHYSICS FOR LIFE SCIENCES <b>AND</b> ELEMENTS OF CALCULUS I <b>OR</b> CALCULUS I <b>AND</b> PHYSICS FOR LIFE SCIENCES</li> </ul>	<ul style="list-style-type: none"> <li>GENERAL CHEMISTRY II</li> <li>BIOLOGICAL CONCEPTS OF HEALTH</li> <li>INTEGRATED MATHEMATICS &amp; PHYSICS II <b>OR</b> ELEMENTS OF CALCULUS II <b>AND</b> PHYSICS FOR LIFE SCIENCES II <b>OR</b> CALCULUS II <b>AND</b> INTRODUCTORY ELECTRICITY &amp; MAGNETISM</li> <li>LINEAR ALGEBRA I</li> </ul>	OFF
TWO	<ul style="list-style-type: none"> <li>APPLIED DIFFERENTIAL EQUATIONS</li> <li>ADVANCED CALCULUS I</li> <li>THERMAL PHYSICS</li> <li>ELECTRICITY &amp; MAGNETISM I</li> <li>INTRODUCTION TO CO-OPERATIVE EDUCATION</li> <li>1 LIBERAL EDUCATION ELECTIVE</li> </ul>	<ul style="list-style-type: none"> <li>INTRODUCTION TO BIOCHEMISTRY</li> <li>EXPERIMENTAL TECHNIQUES IN PHYSICS</li> <li>BIOPHYSICS OF EXCITABLE CELLS</li> <li>ELECTRICITY AND MAGNETISM II</li> <li>MECHANICS</li> </ul>	WORK TERM ONE
THREE	<ul style="list-style-type: none"> <li>QUANTUM MECHANICS I</li> <li>MATHEMATICAL PHYSICS</li> <li>3 ELECTIVES</li> </ul>	WORK TERM TWO	WORK TERM THREE
FOUR	<ul style="list-style-type: none"> <li>SCIENCE COMMUNICATION</li> <li>RADIOACTIVITY &amp; RADIATION INTERACTIONS</li> <li>2 ELECTIVES</li> <li>MEDICAL IMAGING MODALITIES OR 1 ELECTIVE</li> </ul>	<ul style="list-style-type: none"> <li>MOLECULAR BIOPHYSICS</li> <li>INTERMEDIATE LABORATORY</li> <li>QUANTUM MECHANICS II</li> <li>1 ELECTIVE</li> <li>COMPUTATIONAL METHODS IN MATERIALS SCIENCE</li> </ul>	WORK TERM FOUR
FIVE	WORK TERM FIVE	<ul style="list-style-type: none"> <li>CLINICAL APPLICATIONS OF PHYSICS IN MEDICINE OR 1 ELECTIVE</li> <li>ADVANCED PHYSICS LABORATORY</li> <li>3 ELECTIVES</li> </ul>	

NOTE: 1.00 CREDITS (2 COURSES) OF LIBERAL EDUCATION ELECTIVES ARE REQUIRED FOR COMPLETION OF THE PROGRAM

AND 1.50 CREDITS (3 COURSES) ARE REQUIRED FROM EITHER LIST A OR LIST B AS FOLLOWS:

## LIST A: BIOLOGICAL PHYSICS STREAM

- Structure and Function in Biochemistry
- Membrane Biochemistry
- Foundations in Molecular Biology and Genetics
- Molecular Biology of the Cell
- Protein and Nucleic Acid Structure
- Optics: Fundamentals and Applications
- Biological Nanomaterials

## LIST B: MEDICAL PHYSICS STREAM

- Concepts in Human Physiology
- Foundations in Molecular Biology and Genetics
- Principles of Disease
- Subatomic Physics
- Biomedical Physiology
- Immunology
- Vertebrate Structure and Function
- Optics: Fundamentals and Applications

BASED ON THE 2022/23 UNDERGRADUATE CALENDAR

PLEASE SEE THE CURRENT UNDERGRADUATE CALENDAR FOR MORE INFORMATION