

# BIOMEDICAL PHYSICS (HBSc)

*Department of Chemical & Physical Sciences*

**Biomedical Physics combines** fundamental courses in physics, mathematics, chemistry, and biology together with specialized courses in biological physics. This new program has been introduced in response to the growing demand for specialists with physics background in the areas of biology and medicine. Are you interested in understanding how the building blocks of biology, such as proteins, DNA and RNA, fit together and interact to form the living world around us? Maybe you would like to build an instrument that can rapidly identify blood-borne infections or diagnose and track the progression of Alzheimer's disease. Perhaps you're interested in programming a computer to figure out the ideal way for a drug to target and attack a cancer cell. These are some of the challenges that Biomedical physicists tackle every day.

## MAKE THE MOST OF YOUR TIME AT UTM!

We want to help you maximize your university experience, so we've pulled together information and interesting suggestions to get you started, although there are many more! As you review the chart on the inside pages, note that many of the suggestions need not be restricted to the year they are mentioned. In fact, activities such as joining an academic society, engaging with faculty and seeking opportunities to gain experience should occur in each year of your study at UTM. Read through the chart and create your own plan using **My Program Plan** found at [www.utm.utoronto.ca/program-plans](http://www.utm.utoronto.ca/program-plans)

### Programs of Study (POSt)

- Specialist Program ERSPE1944 Biomedical Physics Specialist (Science)
- Major Program ERMAJ1944 Physics (Science)
- Minor Program ERMIN1944 Physics (Science)

### Check out...

Get a physicist's perspective on the building blocks of the living world in PHY332H5. You'll learn about a wide range of biophysical techniques commonly used in life science.

### What can I do with my degree?

The career you choose will depend on your experience and interests. Visit the Career Centre to explore your career options.

**Careers for Graduates:** Medical physicist; Ultrasound technician; Radiation therapist; Photodynamic therapist; Nuclear medicine technologist; Biological technician; Pharmacologist; Informationist; Community health worker; Doctor

**Workplaces:** Government; Research Laboratories; Manufacturing; Research centres; Hospitals and medical centres; Pharmaceuticals; Biotechnology; Academic medical centres/laboratories.



# BIOMEDICAL PHYSICS

## SPECIALIST Program Plan

## HOW TO USE THIS PROGRAM PLAN

Read through each year. Investigate what appeals to you here and in any other Program Plans that apply to you.

Visit [www.utm.utoronto.ca/program-plans](http://www.utm.utoronto.ca/program-plans) to create your own plan using [My Program Plan](#). Update your plan yearly.



	1 <sup>ST</sup> YEAR	2 <sup>ND</sup> YEAR
PLAN YOUR ACADEMICS*	<p>Enrol in courses PHY146H5, 147H5; BIO152H5; (CHM110H5, 120H5); and MAT135Y5/ 137Y5/ 157Y5.</p> <p>Choose a program of study (Subject POST) once you complete 4.0 credits. Use the <b>Degree Explorer Planner</b> and the <b>Academic Calendar</b> to plan your degree.</p> <p>Start strong and get informed with <b>utmONE</b> and <b>LAUNCH</b> through the Centre for Student Engagement (CSE). Join a RGASC <b>Peer Facilitated Study Group</b>.</p>	<p>Enrol in courses PHY241H5, 245H5, 255H5; JCP221H5, JCP265H5; MAT232H5, 212H5/ 244H5/ STA256H5; and BIO206H5.</p> <p>Consider applying for <b>Research Opportunity Program (ROP)</b> courses PHY299Y and PHY399Y and work in a research lab. Visit the EEU website for <b>ROP Course Prerequisites</b>. Attend the RGASC's <b>P.A.R.T.</b> to enhance your research skills.</p>
BUILD SKILLS	<p>Use the <b>Co-Curricular Record (CCR)</b>. Search for opportunities beyond the classroom, and keep track of your accomplishments.</p> <p>Attend the <b>Get Experience Fair</b> through the Career Centre (CC) to learn about on- and off-campus opportunities.</p>	<p>Use the <b>Career Learning Network (CLN)</b> to find postings for on- and off-campus work and volunteer opportunities.</p> <p>Work on-campus through the <b>Work-Study program</b>. View position descriptions on the CLN.</p>
BUILD A NETWORK	<p>Networking simply means talking to people and developing relationships with them. Start by joining the <b>UTM Physics Club</b>. Go to the Erindale Chemical &amp; Physical Sciences Society's <b>Meet the Profs Night</b>.</p> <p>Visit the UTM Library <b>Reference Desk</b>.</p>	<p>Do you have a professor you really like or connect with? Ask them a question during office hours. Discuss an assignment. Go over lecture material. Don't be shy! Learn <b>Tips On How to Approach a Professor</b> available through the Experiential Education Unit (EEU).</p>
BUILD A GLOBAL MINDSET	<p>Attend events held by the <b>International Education Centre (IEC)</b>, whether you are an international or domestic student. Explore different cultures through food, music, and sport or through sight-seeing around the GTA.</p> <p>Start with the <b>International Education Week</b> events and learn about the diversity, culture, and international opportunities on campus!</p>	<p>Embark on a <b>UTM Abroad Glocal Impact Project</b> through the IEC. Take advantage of this opportunity to travel with a faculty member and learn about a topic of interest in a unique location.</p> <p>Interested in deepening your global perspective? Register for the <b>Global Citizenship Certificate</b> offered by the IEC.</p>
PLAN FOR YOUR FUTURE	<p>Attend the <b>Program Selection &amp; Career Options</b> workshop offered by the Office of the Registrar and the Career Centre (CC).</p> <p>Check out <b>Careers by Major</b> at the CC to see potential career options.</p>	<p>Explore careers through the CC's <b>Extern Job Shadowing Program</b>.</p> <p>Considering <b>further education</b>? Attend the CC's <b>Graduate and Professional Schools Fair</b>. Talk to professors – they are potential mentors and references.</p>

\*Consult the Academic Calendar for greater detail on course requirements, program notes and degree requirements.

3 <sup>RD</sup> YEAR	4 <sup>TH</sup> OR FINAL YEAR
<p>Enrol in courses PHY324H5, 325H5, 332H5, 333H5, 347H5; JCP321H5 and 322H5.</p> <p>Throughout your undergraduate degree:</p> <ul style="list-style-type: none"> <li>use the <b>Degree Explorer</b> to ensure you complete your degree and program requirements</li> <li>see the <b>Office of the Registrar</b> and the <b>CPS Academic Counsellor</b></li> </ul>	<p>Enrol in courses PHY433H5/ 426H5, 451H5, (JCP463H5, PHY473H5)/ PHY489Y5/ CPS400Y5/ JCB487Y5; and JCP421H5.</p> <p>Senior students complete a research project. Speak to the <b>CPS Academic Counsellor</b> to discover available opportunities such as Independent Study Courses PHY473H5 and PHY489Y5.</p> <p>Log on to ACORN and request graduation.</p>
<p>Apply to <b>TRIUMF</b> - Canada's national laboratory for particle and nuclear physics - that accepts 70 undergraduate students from across the country and abroad every year as part of its Undergraduate Student Program.</p> <p>Apply for <b>NSERC Undergraduate Program awards</b> such as <b>USRA</b> to work in a lab in the summer.</p>	<p>Skills are transferrable to any job regardless of where you develop them. Need to strengthen your presentation skills? Consider a role as a RGASC <b>Facilitated Study Group Leader</b>.</p>
<p>Establish a professional presence on social media (e.g., LinkedIn).</p> <p>Learn about local issues! Consider a CSE <b>Alternative Reading Week (ARW)</b> to become engaged with the local community, and involved in social change and community development</p>	<p>Join a professional association. Check out the <b>Canadian Association of Physicists</b>, the <b>Canadian Organization of Medical Physicists</b> or the <b>American Physical Society</b>.</p> <p>Go to the <b>Canadian Undergraduate Physics Conference</b> or the <b>Women in Physics Canada Conference</b>.</p>
<p>Earn credits overseas! Study for a summer, term or year at one of 120 universities. The CPS department has identified 9 partners which are most relevant to our students. Speak to the <b>IEC</b> for details about <b>Course Based Exchange</b> and funding.</p>	<p>Why not work abroad? Read up on worldwide employment trends and industry outlooks through <b>GoInGlobal</b>. Attend the <b>Go Global Expo</b>. See if you are eligible for <b>International Experience Canada</b>.</p>
<p>What's your next step after undergrad?</p> <p>Entering the workforce? Evaluate your career options through a CC <b>Career Counselling appointment</b>. Create a job search strategy - book a CC <b>Employment Strategies appointment</b>.</p> <p>Considering further education? Research application requirements, prepare for admission tests (LSAT, MCAT), and research funding options (OGS, NSERC, CIHR) for graduate studies.</p>	<p>Market your skills to employers. Get your <b>resume critiqued</b> at the CC. Attend the CC workshop <b>Now That I'm Graduating What's Next?</b></p> <p>Write a strong application for further education. Attend the CC's <b>Mastering the Personal Statement workshop</b>.</p>

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Visit [www.utm.utoronto.ca/program-plans](http://www.utm.utoronto.ca/program-plans) for the online version and links.

# BIOMEDICAL PHYSICS

## Skills developed in Biomedical Physics

To be competitive in the job market, it is essential that you can explain your skills to an employer. Visit the Career Centre to learn how to articulate and market the following skills:

**Technical:** strong emphasis on lab work using state-of-the-art technology and advanced instrumentation.

**Communication:** ability to explain complex concepts and theories to others; clearly explain scientific research; and write reports.

**Research:** define a problem; establish hypotheses; apply and integrate fundamental scientific principles; gather scientific data; and review scientific literature.

**Problem-solving:** seeing relationships among factors; analyze data; and interpret observations.

## Get involved

Check out the 100+ student organizations on campus. Here are a few:

- UTM Physics Club
- Erindale Chemical and Physical Sciences Society (ECPS)
- UTM Student Union (UTMSU)
- UTM Athletics Council (UTMAC)

For a listing of clubs on campus visit [www.utm.utoronto.ca/clubs](http://www.utm.utoronto.ca/clubs).

## Services that support you

- Accessibility Services (AS)
- Career Centre (CC)
- Centre for Student Engagement (CSE)
- Experiential Education Unit (EEU)
- Health & Counselling Centre (HCC)
- Indigenous Centre (IC)
- International Education Centre (IEC)
- Office of the Registrar (OR)
- Recreation, Athletics and Wellness Centre (RAWC)
- Robert Gillespie Academic Skills Centre (RGASC)
- UTM Library, Hazel McCallion Academic Learning Centre (HMALC)

## Department of Chemical & Physical Sciences

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[www.utm.utoronto.ca/cps](http://www.utm.utoronto.ca/cps)

## FUTURE STUDENTS

### Admission to UTM

All program areas require an Ontario Secondary School Diploma, or equivalent, with six Grade 12 U/M courses, or equivalent, including English. Your admission average is calculated using English plus your next best five courses. The Grade 12 prerequisites for Biomedical Physics are Advanced Functions, Physics and Chemistry. The approximate average required for admission is mid- to high 70s. More information is available at [utm.utoronto.ca/viewbook](http://utm.utoronto.ca/viewbook).

**NOTE:** During the application process, applicants will select the Chemical & Physical Sciences admissions category but will not officially be admitted to a formal program of study (Specialist, Major, and/or Minor) until after first year.

### Sneak Peek

How are physics and the elasticity of muscles connected? Find out in PHY255H5, a course that applies Physics to biomedical phenomena. Medical techniques such as ultrasound imaging, magnetic resonance imaging, and laser surgery will be discussed.

Our students have access to new, state-of-the-art teaching laboratories and are involved in cutting-edge research projects in our research labs. Our physics equipment ranges from basic mechanic setups all the way to an atomic force microscope (AFM) that can achieve single atom resolution. We have an active undergraduate student club - the UTM Physics Club - to provide students with an opportunity for fun physics-based activities. To date, the main task has been building a Tesla coil that will play music.

### Student Recruitment & Admissions

Innovation Complex, Room 1270  
University of Toronto Mississauga  
3359 Mississauga Rd  
Mississauga ON Canada L5L 1C6

905-828-5400

[www.utm.utoronto.ca/future-students](http://www.utm.utoronto.ca/future-students)

