

# PHYSICS (HBSc)

## Department of Chemical & Physical Sciences

**Life Science?** It began with Physics! Physics encompasses the study of the universe from the largest galaxies to the smallest subatomic particles. Want skills? Physicists learn them! Physicists are problem solvers. Their analytical skills make physicists versatile and adaptable so they work in interesting places.

Want a job? People hire physicists! Physics brings a broad perspective to any problem. Because they learn how to consider any problem they are not bound by context. Like money? Physics beats other sciences! Even when the job market is slow, physicists get job offers for well-paying jobs. Employers know that a physicist brings additional skills with expertise and pay accordingly.

## 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...

Have a soft spot for quantum mechanics? Check out JCP321H5. Curious about lasers and radiation? Then get excited for PHY451H5! Topics include electromagnetism, light metal interactions, multipole radiation and simple models of optical dispersion.

### 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:** Acoustic emissions technician; Astrophysicist; Laser fusion scientist; Material scientist; Medical physicist; Nuclear medical technologist; Optical technician; Planetarium guide; Quality controller; Radiation safety technician; Science journalist; Seismic analyst; Sound engineer.

**Workplaces:** Aerospace; Energy development; Government; Renewable energy; Research laboratories; Manufacturing; Observatories; Planetariums; Research centres; Space industry.



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PHYSICS

MAJOR 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 and PHY147H5) or (PHY136H5 or PHY137H5); (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5; ISP100H5.</p> <p>Choose a program of study (Subject POST) once you complete 4.0 credits. Use the <b>Degree Explorer</b> and the <b>Academic Calendar</b> to plan your degree.</p> <p>Develop foundational academic skills and strategies by enrolling in a <b>utmONE</b> course. Build community and gain academic support through <b>LAUNCH</b>. Join a RGASC <b>Peer Facilitated Study Group</b>.</p>	<p>Enrol in courses PHY241H5, PHY245H5, JCP221H5, JCP265H5.</p> <p>Consider applying for <b>Research Opportunity Program (ROP)</b> courses PHY299Y and PHY399Y. Visit the EEU for <b>ROP Course Prerequisites</b>. Attend the RGASC's <b>Program for Accessing Research Training (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>Attend the <b>Experiential Education Fair</b>.</p>	<p>Use the <b>Career Learning Network (CLNx)</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> <p>Sign up to become an <b>Experiential Education Unit Student Ambassador</b> and earn a CCR notation.</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><b>Attend events held by the International Education Centre (IEC)</b>, whether you are an international or domestic student. Explore your culture and other cultures through weekly/regular conversations, <b>Language Conversation Circles</b>, debates, and activities to enhance your global and intercultural mindset.</p>	<p>Engage in programs like the <b>Global and Intercultural Fluency Training Series (GIFTS)</b> or learn about and prepare for a future <b>UTM Abroad Experience</b> through the IEC to strengthen and enhance your intercultural skill set, and learn about other cultures while sharing your own!</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 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>Job Shadowing Program</b>.</p> <p>Considering <b>further education</b>? Attend the CC's <b>Further Education Showcase</b>. Talk to professors – they are potential mentors and references.</p>

3 <sup>RD</sup> YEAR	4 <sup>TH</sup> OR FINAL YEAR
<p>Enrol in courses PHY324H5, PHY325H5, PHY343H5, PHY347H5, PHY451H5; JCP321H5, 322H5 and 421H5 to complete the Physics major.</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>Senior students complete a research project. Speak to the <b>CPS Academic Counsellor</b> to discover available opportunities such as Independent Study Courses PHY473H5 (Supervised Reading) and CPS489Y5 (Introduction to Research in the Chemical and Physical Sciences).</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> e.g. <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 taking EDS325H5 which allows you to earn a course credit in addition to a placement opportunity as a RGASC <b>Facilitated Study Group Leader</b>.</p> <p>Apply to the CPS400 Internship Course. Speak to the <b>CPS Academic Counselor</b> for more details.</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, involved in social change, community development and contribute to a community-based project.</p>	<p>Join a professional association. Check out the <b>Canadian Association of Physicists</b> or the <b>American Physical Society</b>.</p> <p>Go to a conference such as the <b>Canadian Undergraduate Physics Conference</b>.</p>
<p><b>Earn credits overseas!</b> Apply to study for a summer, term or year at one of 140+ universities. The CPS department has identified partners which are most relevant to our students. Speak to the IEC for details about <b>Course Based Exchange</b>, funding and travel safety.</p>	<p>Learn about working 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) 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>

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

# PHYSICS

## Skills developed in 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 as well as advanced instrumentation and numerical computation.

**Written & oral communication:** explain complex concepts and theories to others, as well as 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:** see 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 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

Want to learn about the mysteries of Schrodinger's cat and other quantum phenomena? Take JCP321H5 and then go even deeper with JCP421H5. You'll never see the world the same way again!

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 focus has been building a Tesla coil that will play music.

### Student Recruitment & Admissions

Innovation Complex, Room 1270  
University of Toronto Mississauga  
3359 Mississauga Rd  
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905-828-5400

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

