

BIOINFORMATICS (HBSc)

Department of Mathematical & Computational Sciences

Bioinformatics is an interdisciplinary science that combines Biology, Computer Science, Statistics, Mathematics, and Chemistry. Bioinformatics is the managing of large amounts of biological information generated from research using advanced computational methods and programs. It involves the computational analysis of gene and genome sequences as well as functional genomic data.

The program includes various courses in genetics and molecular biology which will put into context the vast amounts of genomic data and how they are isolated, sequenced and analyzed. Our computer science courses will give you the foundation to write the kind of computer programs required to analyze large amounts of data.

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. 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

Programs of Study (POSt)

- Specialist Program ERSPE1868 Bioinformatics (Science)

Check out...

Get excited about disease! Take BIO315H5 and learn about exciting new topics in the structure and function of normal and diseased cells. Topics include intercellular communication, and intracellular trafficking and their underlying roles in the disease process. What is the molecular and genetic basis of cancer building? Take BIO477H5 and examine the role of oncogenes, tumor suppressor genes and cell cycle regulating proteins in the development of this disease.

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: Operations research analyst; Bioinformatics specialist; Epidemiologist; Informationist; Biostatistician; Quality controller; Research technician; Validation specialist; Bioethicist; Geneticist; Pharmacy technician; Data scientist; Computer programmer; Systems analyst.

Workplaces: Manufacturing companies; Government; Industrial inspection firms; Scientific R&D; Pharmaceuticals; Hospitals; Computer/software/telecommunication companies.



BIOINFORMATICS

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 to create your own plan using [My Program Plan](#). Update your plan yearly.



	1 ST YEAR	2 ND YEAR	3 RD YEAR	4 TH OR FINAL YEAR
PLAN YOUR ACADEMICS*	<p>Enrol in courses BIO152H5; CHM110H5, 120H5; CSC108H5, 148H5; MAT102H5 and 134Y5/ 135Y5/ 137Y5/ 157Y5.</p> <p>Choose a program of study (Subject POST) once you complete 4.0 credits. Use the Degree Explorer Planner and the Academic Calendar to plan your degree.</p> <p>Start strong and get informed with utmONE and LAUNCH through the Office of Student Transition. Join a RGASC Peer Facilitated Study Group.</p>	<p>Enrol in courses BIO206H5, 207H5; CHM242H5; CSC207H5, 236H5, 263H5; and MAT223H5/ 240H5.</p> <p>Throughout your undergraduate degree:</p> <ul style="list-style-type: none"> use the Degree Explorer to ensure you complete your degree and program requirements. see the Office of the Registrar and the MCS Undergraduate Counsellor for assistance. 	<p>Enrol in courses MAT212H5/ 242H5, 232H5; STA256H5 and 258H5. For third year and higher, enrol in BIO314H5, 372H5, 477H5; CSC321H5/411H5, 343H5, 373H5; and MAT332H5.</p> <p>Consider applying for Research Opportunity Program (ROP) courses BIO399Y, CSC399Y and CSC499Y. Visit the EEO website for ROP Course Prerequisites. Attend the RGASC's P.A.R.T. to enhance your research skills.</p>	<p>Attain 1.0 credits from a list of courses in the Academic Calendar of which at least 0.5 must be at the 400-level.</p> <p>Conduct bioinformatics research under the supervision of a faculty member in CBJ481Y5. Speak to the MCS Undergraduate Counsellor.</p> <p>Log on to ACORN and request graduation.</p>
BUILD SKILLS	<p>Use the Co-Curricular Record (CCR). Search for opportunities beyond the classroom, and keep track of your accomplishments.</p> <p>Attend the Get Experience Fair through the Career Centre (CC) to learn about on- and off-campus opportunities.</p>	<p>Use the Career Learning Network (CLN) to find postings for on- and off-campus work and volunteer opportunities.</p> <p>Work on-campus through the Work-Study program. View position descriptions on the CLN.</p>	<p>Explore your interests. Why not pass on your passion for science? Be a UTM Let's Talk Science Outreach volunteer to support educators and help youth form positive attitudes towards the role that STEM plays in their lives and futures.</p>	<p>Apply to the Ontario Ministry of Natural Resources Internship Program as a recent graduate. Look at the MNR website for eligibility and application details.</p>
BUILD A NETWORK	<p>Networking simply means talking to people and developing relationships with them. Start by joining the Mathematical and Computational Sciences Society (MCSS). Follow them @utmccss.</p> <p>Get to know your TA. View the Math Help Room Schedule on the MCS departmental website. Visit the UTM Library Reference Desk.</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 Tips On How to Approach a Professor available through the Experiential Education Office (EEO).</p>	<p>Establish a professional presence on social media (e.g., LinkedIn).</p> <p>Attend the Biology Department's Biology Seminar Series: weekly seminars featuring exciting guest speakers from across North America.</p>	<p>Join a professional association. Check out the International Society for Computational Biology and the Canadian Medical and Biological Engineering Society.</p> <p>Go to the Canadian Undergraduate Computer Science Conference or Ontario Biology Day.</p>
BUILD A GLOBAL MINDSET	<p>Attend events held by the International Education Centre (IEC) to explore different cultures through food, music, and sport or through sight-seeing around the GTA.</p>	<p>Embark on a UTM Abroad Co-Curricular Experience to Peru through the IEC. Travel with a faculty member and learn about Peru's history of traditional medicine and its transition to modern healthcare.</p> <p>Prefer traveling in Canada? Check out the IEC's UTM Across Canada program.</p>	<p>Earn credits overseas! Study for a summer, term or year at one of 120 universities. The MCS department's topic pick is Lund University (Sweden). Speak to the IEC for details about Course Based Exchange and funding.</p>	<p>Why not work abroad? Read up on worldwide employment trends and industry outlooks through GoInGlobal. Attend the Go Global Expo. See if you are eligible for International Experience Canada.</p>
PLAN FOR YOUR FUTURE	<p>Attend the Program Selection & Career Options workshop offered by the Office of the Registrar and the CC.</p> <p>Check out Careers by Major at the CC to see potential career options.</p>	<p>Explore careers through the CC's Extern Job Shadowing Program.</p> <p>Considering further education? Attend the CC's Graduate and Professional Schools Fair. Talk to professors – they are potential mentors and references.</p>	<p>What's your next step after undergrad?</p> <p>Entering the workforce? Evaluate your career options through a CC Career Counselling appointment. Create a job search strategy — book a CC Employment Strategies appointment.</p> <p>Considering further education? Research application requirements, prepare for admission tests (LSAT, MCAT), and research funding options (OGS, SSHRC).</p>	<p>Market your skills to employers. Get your resume critiqued at the CC. Attend the CC workshop Now That I'm Graduating What's Next?</p> <p>Write a strong application for further education. Attend the CC's Mastering the Personal Statement workshop.</p>

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

BIOINFORMATICS

Skills developed in Bioinformatics

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:

Research: analyze and evaluate information, as well as conduct journal research.

Technical: write, debug, and test programs; research, design and develop computer systems; develop programs (e.g., new computer languages, simulations, systems analysis, etc.); and install software and hardware.

Problem-solving: conceptualize models; formulate, model, and solve problems from diverse areas; and collect, organize, analyze, and interpret results.

Communication: articulate, explain, and teach technical information to others, as well as question and probe to solve computer problems.

Organizational: manage time effectively and organize and maintain data that is stored.

Get involved

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

- Mathematical and Computational Sciences Society (MCSS)
- UTM Student Union (UTMSU)
- UTM Athletics Council (UTMAC)

For a listing of clubs on campus visit www.utm.utoronto.ca/clubs.

Services that support you

- AccessAbility Services (AS)
- Career Centre (CC)
- Centre for Student Engagement (CSE)
- Experiential Education Office (EEO)
- Health & Counselling Centre (HCC)
- Indigenous Centre (IC)
- International Education Centre (IEC)
- Office of Student Transition (OST)
- 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 Mathematical & Computational Sciences

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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. The admission average is calculated with English plus the next best five courses. The Grade 12 prerequisites for this program are Advanced Functions, Calculus, Biology and Chemistry. The approximate average required for admission is high-70s. More information is available at utm.utoronto.ca/viewbook.

NOTE: During the application process, applicants will select the Computer Science, Mathematics & Statistics 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

What's in your genes? Take BIO207H5 to find out about the principles of Mendelian inheritance and modern genetics using examples from medical research, evolutionary biology, agriculture and conservation biology. The first two years of the program are an introduction to broadly applicable tools and ideas. You'll learn computing languages, including Python (CSC108H5), Java (CSC207H5), and C (CSC209H5), and you'll get a peek at the mathematical techniques (CSC236H5) and structures (CSC148H5 and CSC263H5) that underpin the discipline.

Student Recruitment & Admissions

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905-828-5400

www.utm.utoronto.ca/future-students

