

BIOINFORMATICS (HBSc)

Department of Mathematical & Computational Sciences

Bioinformatics is an interdisciplinary science that combines Biology, Computer Science, Statistics, Mathematics, and Chemistry. Bioinformatics is the management of large amounts of biological information generated from research using advanced computational methods and programs.

The program includes various courses in genetics and molecular biology, which will contextualize genomic data and explain how it is isolated, sequenced and analyzed. Our computer science courses will give you the foundation to write the 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, 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

Program 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 cancers.

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 |
|------------------------|---|--|
| PLAN YOUR ACADEMICS* | <p>Enrol in courses BIO152H5; CHM110H5, 120H5; CSC108H5, 148H5; MAT102H5 and (132H5, 134H5)/ (135H5, 136H5)/ 134Y5/ 135Y5/ 137Y5/ 157Y5.</p> <p>Choose a program of study (Subject POST) once you complete 4.0 credits. Use the Degree Explorer and the Academic Calendar to plan your degree.</p> <p>Start strong and get informed with utmONE and LAUNCH through the Centre for Student Engagement (CSE). 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. |
| 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 (CLNx) 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 CLNx.</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 @utmmcss.</p> <p>Get to know your TA. View the Math Learning Centre 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 Unit (EEU).</p> |
| BUILD A GLOBAL MINDSET | <p>Attend events held by the International Education Centre (IEC), whether you are an international or domestic student. Explore your culture and other cultures through weekly/regular conversations, Language Conversation Circles, debates, and activities to enhance your global and intercultural mindset.</p> | <p>Engage in programs like the Global and Intercultural Fluency Training Series (GIFTS) or learn about and prepare for a future UTM Abroad Experience 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 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 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> |

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

| 3 RD YEAR | 4 TH OR FINAL YEAR |
|--|--|
| <p>Enrol in courses MAT212H5/242H5, 232H5; STA256H6 and 258H5. In this year or the next, enrol in BIO314H5, 372H5, 477H5; CSC413H5/ 321H5/ 411H5/ 311H5, 343H5, 373H5; MAT332H5.</p> <p>Consider applying for Research Opportunity Program (ROP) courses BIO399Y, CSC399Y and CSC499Y. Visit the EEU 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> |
| <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 MNRF website for eligibility and application details.</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> |
| <p>Earn credits overseas! Apply to study for a summer, term or year at one of 140+ universities. The MCS department has identified partners which are most relevant to our students. Speak to the IEC for details about Course Based Exchange, funding and travel safety.</p> | <p>Learn about working 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> |
| <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> |

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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 and research, design and develop computer systems (e.g., new computer languages, simulations, system analysis, etc.)

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 diagnose computer problems.

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

Get involved

Check out the 100+ 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

- 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)
- The Math Learning Centre (MLC)
- UTM Library, Hazel McCallion Academic Learning Centre (HMALC)

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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 low to mid 80s. 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) and Java (CSC207H5), and you'll get a peek at the mathematical techniques (CSC236H5) and data structures (CSC148H5 and CSC263H5) that underpin the discipline.

Student Recruitment & Admissions

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www.utm.utoronto.ca/future-students

