Come and Discover Science at McMaster

Experience an education that represents far more than a collection of facts, concepts, and answers. Our award-winning professors and researchers value innovative teaching, a lifelong passion for learning and working at the frontiers of knowledge.

McMaster’s Faculty of Science will prepare you to become a leader in a wide variety of science-related careers. We are committed to developing your ability to evaluate information, think critically, and apply your understanding of science to a wide range of real-world problems and issues.

I invite you to explore Science at McMaster University.

Dr. Mic Farquharson - Associate Dean (Academic)

OFFICE OF THE ASSOCIATE DEAN (ACADEMIC)

The Office of the Associate Dean of Science (Academic) is available to assist science students with all matters related to their undergraduate degree. Our qualified team of academic advisors are available to all students to help answer questions, give direction and provide guidance.

The Associate Dean of Science (Academic) Office promotes undergraduate student success through:

- Academic Advising
- Support and Resources
- Knowledge and Guidance

We are available to provide immediate assistance during drop-in advising: Monday to Friday from 9:00am - 4:30pm.

Contact the Associate Dean (Academic) Office at:

science.mcmaster.ca/associatedean

905.525.9140 ext. 27590
scienrecruit@mcmaster.ca

Science is a research-focused and student-centred Faculty at the heart of McMaster University.

#72 in the World in the Times Higher Education World University Rankings (2020)

Science Gateway Programs
Faculty of Science Gateway Programs

Whether you know exactly what area of science you are interested in or are still undecided (or change your mind after you arrive!), the structure of our four Level I Gateway programs will provide you with a range of Level II program options.

Good planning is important! Before selecting your Level I courses, review the admission requirements for each of the Level II programs you are considering. While some students continue in a program from the same area of study as their Level I program (for example, selecting Level II Honours Biology after completion of Life Sciences Gateway), others discover a new area of interest and change their original direction (for example, a Life Sciences Gateway student may choose to move into Honours Physics or a Chemical & Physical Sciences Gateway student may opt for Honours Mathematics and Statistics). Regardless of your path, at the end of first year you will rank order and apply to up to four Level II programs.

Visit mapsci.ca to start planning your journey.
Chemical and Physical Sciences

Students in Chemical and Physical Sciences do not memorize facts or equations; they learn how to ask questions and answer them through problem solving.

ADMISSION REQUIREMENTS (ONTARIO):
Completion of the High School Diploma plus 6 Grade 12 U/M requirements, including:
- English
- Advanced Functions
- Calculus & Vectors
- Chemistry
- Physics

Environmental and Earth Sciences

With increasing attention to global warming and climate change, there have been dramatically more scientific research and employment opportunities in the area of environmental and earth sciences.

ADMISSION REQUIREMENTS (ONTARIO):
Completion of the High School Diploma plus 6 Grade 12 U/M requirements, including:
- English
- Advanced Functions or Calculus & Vectors
- Biology or Chemistry
- One of: Advanced Functions, Calculus & Vectors, Biology, Chemistry, Physics

Life Sciences

Life Sciences prepares students for a variety of careers in science and beyond by providing a firm foundation in traditional scientific disciplines and exposure to multidisciplinary approaches to solving pressing problems.

ADMISSION REQUIREMENTS (ONTARIO):
Completion of the High School Diploma plus 6 Grade 12 U/M requirements, including:
- English
- Biology
- Advanced Functions or Calculus & Vectors
- One of: Advanced Functions, Calculus & Vectors, Chemistry, Physics

Mathematics and Statistics

Essential skills, such as quantitative and statistical reasoning, are acquired in the Mathematics and Statistics program through courses taught by recognized leaders in research and teaching.

ADMISSION REQUIREMENTS (ONTARIO):
Completion of the High School Diploma plus 6 Grade 12 U/M requirements, including:
- English
- Advanced Functions
- Calculus & Vectors

- ANTICIPATED TARGET OUAC APPLICATION

ADMISSION AVERAGE ENROLMENT CODE
Program Options:

**Level II Program Options:**

- **Arts and Social Sciences:**
  - **Biology and Environmental Sciences** • BIOLOGY 1A03 & 1M03
  - **Actuarial and Financial Mathematics** • 1 of MATH 1A03, 1LS3, 1X03
  - **Chemical Biology** • BIOLOGY 1A03 & 1M03
  - **Biology and Psychology, Neuroscience & Behaviour** • BIOLOGY 1A03 & 1M03
  - **Biology and Mathematics** • BIOLOGY 1A03 & 1M03
  - **Biochemistry** • BIOLOGY 1A03 & 1M03
  - **Astrophysics** • 2 of MATH 1A03, 1AA3, 1LT3, 1X03, 1XX3
  - **Biology – Physiology** • BIOLOGY 1A03 & 1M03

- **Life Sciences:**
  - **Biology – Discovery Sub-Plan**
  - **Biology – Limited Enrolment Program**

- **Mathematics and Statistics:**
  - **Mathematics and Statistics – Mathematics Sub-Plan**
  - **Mathematics and Statistics – Statistics Sub-Plan**
  - **Mathematics and Computer Science** • 1 of MATH 1A03, 1LS3, 1X03
  - **Mathematics and Physics** • 1 of MATH 1A03, 1LS3, 1X03

**Field Placements:**

- Co-op Program (Beginning at Level III)

**Department of Biology:**

- School of Earth, Environment and Society

**Department of Chemistry and Chemical Biology:**

- Department of Chemistry, Chemical Biology

**Department of Earth Sciences:**

- Department of Earth and Environmental Sciences

**Department of Mathematics and Statistics:**

- Department of Mathematics and Statistics

**School of Interdisciplinary Science:**

- School of Interdisciplinary Studies

**Faculty of Science Program Overview:**

- **Program Overview:**
  - **Level II Program:**
    - **Admission Requirements:**
      - **Completion of at least 24 units including:**
        - 2 courses from Science I Course List
        - PHYSICS 1A03 or 1C03
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
        - 1 course from Science I Course List
        - PHYSICS 1A03 or 1C03
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
        - PSYCH 1FF3 or 1XX3
        - 1 of MATH 1AA3, 1LT3, 1XX3
        - 1 of MATH 1A03, 1LS3, 1X03
        - BIOLOGY 1A03 & 1M03
        - MATH 1B03
        - 1 of MATH 1A03, 1AA3, 1LT3
        - 4 courses from Science I Course List
        - COMPSCI 1JC3, 1MD3, 1XA3
        - MATH 1A03 or 1LS3
        - EARTHSC 1G03 or ENVIRSC 1C03
        - 2 courses from Science I Course List
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
        - BIOLOGY 1A03 & 1M03
        - 2 courses from Science I Course List
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
        - 3 courses from Science I Course List
        - CHEM 1A03
        - PHYSICS 1AA3 or 1CC3
        - PHYSICS 1A03 or 1C03
        - PHYSICS 1D03
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
      - **Chemistry:**
        - CHEM 1A03 & 1AA3
        - MATH 1A03 or 1LS3
        - PHYSICS 1A03 or 1T03
      - **Environmental Sciences:**
        - ENVRSC 1F03
        - 2 courses from Science I Course List
      - **Life Sciences:**
        - BIOLOGY 1A03
        - ENVRSC 1C03
      - **Mathematics and Physics:**
        - 1 of MATH 1A03, 1LS3, 1X03
      - **Mathematics and Statistics:**
        - 1 of MATH 1A03, 1LS3, 1X03
    - **Admission Requirements:**
      - **Completion of at least 24 units including:**
        - 2 courses from Science I Course List
        - PHYSICS 1A03 or 1C03
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
        - BIOLOGY 1A03 & 1M03
        - 2 courses from Science I Course List
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
        - 3 courses from Science I Course List
        - CHEM 1A03
        - PHYSICS 1AA3 or 1CC3
        - PHYSICS 1A03 or 1C03
        - PHYSICS 1D03
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
      - **Chemistry:**
        - CHEM 1A03 & 1AA3
        - MATH 1A03 or 1LS3
        - PHYSICS 1A03 or 1T03
      - **Environmental Sciences:**
        - ENVRSC 1F03
        - 2 courses from Science I Course List
      - **Life Sciences:**
        - BIOLOGY 1A03
        - ENVRSC 1C03
      - **Mathematics and Physics:**
        - 1 of MATH 1A03, 1LS3, 1X03
      - **Mathematics and Statistics:**
        - 1 of MATH 1A03, 1LS3, 1X03
    - **Admission Requirements:**
      - **Completion of at least 24 units including:**
        - 2 courses from Science I Course List
        - PHYSICS 1A03 or 1C03
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
        - BIOLOGY 1A03 & 1M03
        - 2 courses from Science I Course List
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
        - 3 courses from Science I Course List
        - CHEM 1A03
        - PHYSICS 1AA3 or 1CC3
        - PHYSICS 1A03 or 1C03
        - PHYSICS 1D03
        - MATH 1A03 or 1LS3
        - CHEM 1A03 & 1AA3
      - **Chemistry:**
        - CHEM 1A03 & 1AA3
        - MATH 1A03 or 1LS3
        - PHYSICS 1A03 or 1T03
      - **Environmental Sciences:**
        - ENVRSC 1F03
        - 2 courses from Science I Course List
      - **Life Sciences:**
        - BIOLOGY 1A03
        - ENVRSC 1C03
      - **Mathematics and Physics:**
        - 1 of MATH 1A03, 1LS3, 1X03
      - **Mathematics and Statistics:**
        - 1 of MATH 1A03, 1LS3, 1X03
Programs leading to the Honours Bachelor of Applied Science degree (Hons.B.A.Sc.)

Graduates from the Honours B.A.Sc. Human Behaviour programs are well equipped to enter any work environment that requires understanding the determinants of human behavior and/or an excellent preparatory degree for a range of applied certificate/diploma training. Students in the specialties graduate with both an honours degree from McMaster University and a Graduate Certificate/Diploma from Mohawk College.

The Honours Sustainable Chemistry program provides students with a uniquely integrated and inquiry-based approach to research and problem-solving in chemistry and chemistry-related areas. The traditional practices of Chemistry are examined through the lens of sustainability, with the objective to develop students who can identify and implement better ways to practice chemistry.

LEVEL I PROGRAM

Degree Programs leading to the Bachelor of Science degree (B.Sc.)

- **Chemical and Physical Sciences**
  - **Environmental Sciences**
  - **Medical and Biological Physics**
  - **Molecular Biology and Genetics**
  - **Psychology, Neuroscience & Behaviour**
  - **Chemistry**
  - **Physics**

- **Level II Program**
  - **Admission Requirements**
  - **Offered By**

- **Field Placements**
  - **Co-op Program (Beginning at Level III)**
  - **Limited Enrolment Program**

- **Science I Course List**: MATH 1A03, 1AA3, 1F03, 1FB3, 1FF3, 1X03, 1XX3, BIOPHYS 1F03, 1A03, 1AA3, 1C03, 1CC3, CHEM 1F03, 1A03, 1AA3, 1D03, 1E03, 1F03, 1FF3, 1X03, 1XX3, BIOPHYS 1S03, 1D03, 1A03, 1AA3.
CAREERS:
Biochemistry and Biomedical Sciences students develop a range of skills that are easily transferred to a wide range of careers. Graduates have pursued careers in the following areas:

- Immunology
- Nutritional Science
- Bioinformatics Science
- Biomedical Engineering
- Gene Therapy
- Toxicology
- Pathology
- Embryology
- Pharmacology

LEVEL II PROGRAMS:
Honours B.Sc. Programs
- Honours Biochemistry

B.Sc. Program
- Life Sciences

AREAS OF RESEARCH:
- Biotechnology and Drug Discovery
- Protein Structure and Enzyme Mechanisms
- Membrane Structure and Function
- Molecular Pharmacology
- Nucleic Acid Structure and Function
- Neurodegenerative Disease

POSTGRADUATE OPPORTUNITIES:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:

- Medicine
- Dentistry
- Pharmacy
- Structural Biology
- Chemical Biology
- Cancer and Stem Cells

Biochemistry and Biomedical Sciences

The Department of Biochemistry and Biomedical Sciences is known for outstanding research and education focused on the chemical processes within and relating to living organisms. Our research fosters innovation and discovery, and ensures excellence in our undergraduate and graduate programs.

FOCUS OF STUDY:
Biochemistry is the study of the chemical and molecular basis of life, seeking to describe and understand the structure, function, and organization of living matter in molecular terms. It is a continuum with structural and molecular biology, and builds on a strong foundation of the other natural sciences. Undergraduate programs offer a diverse background in biochemistry and molecular biology, including advanced topics in the following areas:

- Biotechnology and Drug Discovery
- Protein Structure and Enzyme Mechanisms
- Membrane Structure and Function
- Nucleic Acid Structure and Function
- Biochemistry Research Skills
- Genetic Engineering
- Neurodegenerative Disease
- Pathology
- Embryology
- Pharmacology

AREAS OF RESEARCH:
- Biotechnology and Drug Discovery
- Protein Structure and Enzyme Mechanisms
- Membrane Structure and Function
- Molecular Pharmacology
- Nucleic Acid Structure and Function
- Neurodegenerative Disease

POSTGRADUATE OPPORTUNITIES:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:

- Medicine
- Dentistry
- Pharmacy
- Structural Biology
- Chemical Biology
- Cancer and Stem Cells
- Eukaryotic Cell Biology and Human Disease
- Microbiology and Antimicrobial Drug Discovery
- Veterinary Medicine
- Law
- MBA
Biology

The Department of Biology is the hub of research and teaching related to living systems and environments, and has knowledge that contributes to advancement in environmental and medical biotechnology. With undergraduate specializations in Environmental Science, Physiology, Psychology, Mathematics, Neuroscience and Molecular Biology and Genetics, the Department offers students the ability to prepare for careers in scientific research, industry and the public sector.

FOCUS OF STUDY:
- Biology's outstanding faculty members have a solid foundation in both teaching and research and work diligently to bring current research perspectives and skill into the classroom and teaching laboratories. Biology students benefit from this expertise and have the opportunity to explore a wide range of topics including:
  - Bioinformatics and Functional Genomics
  - Evolutionary Biology and Ecology
  - Microbiology and Plant Biology
  - Environmental Physiology

LEVEL II PROGRAMS:
- B.Sc. Programs
  - Honours Biology
  - Honours Biology Discovery Sub-Plan
  - Honours Biology and Environmental Sciences
  - Honours Biology and Mathematics

AREAS OF RESEARCH:
- Bioinformatics and Functional Genomics
- Evolutionary Biology and Ecology
- Population Ecology
- Landscape Ecology
- Ecostechnology

B.Sc. Program
- Plant Physiology
- Animal Physiology
- Neurophysiology
- Environmental Physiology
- Genetics and Molecular Biology
- Cell and Molecular Biology and Genetics
- Plant Biology and Physiology

POSTGRADUATE OPPORTUNITIES:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:
- Medicine
- Pharmacy
- Optometry
- Dentistry
- Veterinary Medicine
- Pharmacy
- MBA
- M.Phil.
- Bachelor of Education

Chemistry and Chemical Biology

The Department of Chemistry and Chemical Biology is a vibrant place to study and conduct research in chemical sciences. Its collaborative approach links research and teaching with other areas and disciplines on campus. Faculty members and facilities of international calibre make McMaster one of the best Chemistry and Chemical Biology departments in Canada. The Department offers an inspiring learning environment by giving students hands-on access to experimental learning in laboratories using modern instrumentation and exceptional opportunities to join research teams.

FOCUS OF STUDY:
- Chemistry deals with the properties and reactions of chemical substances, and their interactions with energy and with one another. Chemistry plays a central role in science, from making new beneficial substances, to detecting, identifying, and remediating toxic materials in the environment. Chemical Biology addresses problems in drug discovery, the molecular basis of disease and using small molecules to regulate biological function.
- All programs provide students with a unique integrated lab experience and inspire-based approach to research and problem-solving in chemistry-related areas. Students enrolling in any program have an opportunity to specialize in upper years by selecting courses that cover topics such as the following:
  - Molecular Structure and Reactivity
  - Transition Metal Chemistry
  - Biorganic Chemistry
  - Drug Design and Development

LEVEL II PROGRAMS:
- B.Sc. Programs
  - Honours Chemistry
  - Honours Chemical Biology
  - Honours Sustainable Chemistry (Co-op option begins in Level III)
  - Honours Sustainable Chemistry (Co-op option begins in Level III)

AREAS OF RESEARCH:
- Analytical and Environmental Chemistry
- Biological Chemistry
- Organic Chemistry
- Inorganic Chemistry
- Physical and Theoretical Chemistry
- Catalysis
- Polymer Synthesis
- Nanotechnology

POSTGRADUATE OPPORTUNITIES:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:
- Master of Science (M.Sc.) and Doctorate in Chemistry
- Biotechnology
- Chemical Education
- Biotechnology
- Materials Chemistry
- Organic Chemistry

Careers in the following areas:
- Molecular Structure and Reactivity
- Transition Metal Chemistry
- Biorganic Chemistry
- Drug Design and Development

LEVEL II PROGRAMS:
- B.Sc. Programs
  - Honours Chemistry
  - Honours Chemical Biology
  - Honours Sustainable Chemistry (Co-op option begins in Level III)

AREAS OF RESEARCH:
- Analytical and Environmental Chemistry
- Biological Chemistry
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- Materials Chemistry
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Careers in the following areas:
- Molecular Structure and Reactivity
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- Drug Design and Development

LEVEL II PROGRAMS:
- B.Sc. Programs
  - Honours Chemistry
  - Honours Chemical Biology
  - Honours Sustainable Chemistry (Co-op option begins in Level III)

AREAS OF RESEARCH:
- Analytical and Environmental Chemistry
- Biological Chemistry
- Organic Chemistry
- Inorganic Chemistry
- Physical and Theoretical Chemistry
- Catalysis
- Polymer Synthesis
- Nanotechnology

POSTGRADUATE OPPORTUNITIES:
Earth, Environment, and Society

The School of Earth, Environment, and Society is an internationally recognized centre of research and training. It offers innovative hands-on lab experiments and field work to provide students with relevant experiences. Students learn about the earth’s history, environmental and contaminant geochemistry, hydrology and hydrogeology, ecology, environmental issues, urban planning, and geographic information science (GIS).

FOCUS OF STUDY:
Human life and society depend on environmental resources we often take for granted: air, water, soil and the mineral and organic resources of the earth. With increasing attention to global warming and climate change, there are dramatically more scientific research and employment opportunities in this area.

The School of Earth, Environment and Society provides problem-based and inquiry learning experiences that will challenge students to think independently and apply the knowledge they gain. Students in the Earth, Environment and Society programs can explore the following topics:

- Earth, Environment and Society
- Earth Science/Geology
- Earth History
- Geochemistry
- Climate Change
- Sustainability
- Geographic Information Science
- Environmental Assessment

CAREERS:
Graduates have pursued careers in the following areas:

- Petroleum Exploration
- Geochemistry
- Climate Change
- Sustainability
- Geographic Information Science
- Environmental Assessment

Earth, Environment, and Society students develop a range of skills that are easily transferred to a wide range of careers. Graduates have pursued careers in the following areas.

POSTGRADUATE OPPORTUNITIES:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:

- Geochemistry
- Natural Disasters
- Environmental Assessment
- Hydrology
- Geographic Information Science

Life Sciences

The Life Sciences programs provide students with the opportunity to study various topics in human health, aging, and disease. Our curriculum is organized under the categories of communication, experiential learning, and research skills. A unique aspect to our programs involves the implementation of community-based projects and peer mentoring experiential opportunities that are tied to in-course experiences.

FOCUS OF STUDY:
The Life Sciences programs guide students through the interdisciplinary study of the processes underlying human health and disease. Life Sciences courses provide students with opportunities to engage in scientific communication, research skills, laboratory work, experiential projects, placement and thesis opportunities.

The Life Sciences programs have an opportunity to explore a wide range of topics including:

- Human Pathophysiology
- Neurobiology of Disease
- Environmental Change and Human Health
- Public Policy
- Veterinary Medicine
- Dentistry
- Medicine
- Global Health
- Dentistry
- Pharmacy
- Environmental Health and Human Health
- Pharmacy
- Regulatory Affairs
- Environmental Change and Human Health
- Epidemiology
- Scientific Communications
- Clinical Research
- Toxicology
- Environmental Health and Human Health
- Public Policy
- Regulatory Affairs
- Epidemiology
- Environmental Health and Human Health
- Scientific Communications

CAREERS:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:

- Environmental Sciences
- Natural Disasters
- Field Methods
- Hydrology
- Geographic Information Science

AREAS OF RESEARCH:
- Earth Surface Process
- Environment and Health
- Geochronology

B.Sc. Program:
- Environmental Sciences

LEVEL II PROGRAMS:
- Honours B.Sc. Programs
- Honours Earth and Environmental Sciences (Co-op option begins in Level III)
- Honours Environmental Sciences (Co-op option begins in Level III)
- Honours Biology and Environmental Sciences

PILLARS OF LEARNING:
- Communication Skills
- Laboratory Skills
- Experiential Learning
- Knowledge Translation

POSTGRADUATE OPPORTUNITIES:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:

- Biophysics of the Cell and Living Organism
- Genes, Genomes and Society
- Human Pathophysiology
- Epidemiology
- Reproductive Endocrinology
- Genes, Genomes and Society
- Biophysics of the Cell and Living Organism
- Environmental Health and Human Health
- Epidemiology
- Environmental Health and Human Health
- Environmental Health and Human Health
Mathematics and Statistics

Mathematics and Statistics studies patterns underlying diverse phenomena such as the weather, human and animal populations, stock markets, the form of a molecule, or the structure of space and time. The Department of Mathematics and Statistics emphasises a student-centered, interdisciplinary approach to teaching and research.

FOCUS OF STUDY:
The shape of a flower, the form of a molecule, the structure of galaxies – all of these reveal patterns; patterns which can be discovered and studied with mathematics and statistics. Mathematics studies the patterns themselves, discovering subtle and sometimes unexpected features. It also has the ability to clarify and predict properties, which explains its remarkable usefulness throughout the sciences. Statistics studies patterns in data, and is used to distinguish regularities from chance. The Level I program introduces students to the foundational tools and ideas of mathematics, and leads students to the opportunity to explore topics in:

- Cryptography
- Differential Equations
- Time Series

B.Sc. Program
- Real Analysis
- Financial Mathematics and Derivatives
- Mathematical Biology

AREAS OF RESEARCH:
- Mathematical Biology
- Mathematical Logic
- Probability and Statistics

POSTGRADUATE OPPORTUNITIES:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:
- Actuarial Science
- Financial Analysis
- Accounting
- Data Analysis
- Economics
- User Experience Design
- Stock Market Analysis
- Auditing
- Teaching
- Biostatistics
- Cyber Security
- Research Coordination
- Web and Software Development

Physics and Astronomy

The Department of Physics and Astronomy is research intensive, with a strong commitment to excellence in teaching. In its unique undergraduate programs, students begin by learning the fundamental concepts and ideas through which physics has transformed the modern world and then taught how to translate these ideas into the elegant language of mathematics, solve questions and develop deeper understanding.

FOCUS OF STUDY:
An undergraduate degree in Physics and Astronomy is a good choice for anyone who seeks an understanding of the world at its most fundamental level. Physics transcends all other sciences. Its power comes from this universal nature and the fact that training in physics provides transferable skills in experimental design, modelling, computing, critical thinking and problem solving. Students appreciate the challenge and excitement of experimentation in the laboratory through witnessing new physical phenomena, hands-on testing and development of new theories. Students enrolled in a Physics and Astronomy program, have the opportunity to explore a wide range of topics including:

- Physical Reality
- Medical and Health Physics
- Particle Physics
- Astrophysics
- Molecular Biophysics

LEVEL II PROGRAMS:
Honours B.Sc. Programs
- Honours Actuarial and Financial Mathematics (Co-op option begins in Level III)
- Honours Mathematics and Statistics (Co-op option begins in Level III)
- Honours Mathematics and Physics
- Honours Biology and Mathematics

AREAS OF RESEARCH:
- Mathematical Biology
- Mathematical Logic
- Probability and Statistics

POSTGRADUATE OPPORTUNITIES:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:
- Actuarial Science
- Financial Risk Analysis
- Energy Sector
- Climatology
- Medical Physics
- Quantum Mechanics
- Radiation Biology
- Computational Physics
- Quantum Optics
- Thermonuclear and Statistical Mechanics
- Radiative and Nuclear Interactions

FACULTY OF SCIENCE | math.mcmaster.ca

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FACULTY OF SCIENCE | physics.mcmaster.ca

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- Physical Reality
- Medical and Health Physics
- Particle Physics
- Astrophysics
- Molecular Biophysics

LEVEL II PROGRAMS:
Honours B.Sc. Programs
- Honours Actuarial and Financial Mathematics (Co-op option begins in Level III)
- Honours Mathematics and Statistics (Co-op option begins in Level III)

AREAS OF RESEARCH:
- Mathematical Biology
- Mathematical Logic
- Probability and Statistics

POSTGRADUATE OPPORTUNITIES:
Graduates from our programs are well prepared to apply to graduate and professional schools in the following areas:
- Actuarial Science
- Financial Risk Analysis
- Energy Sector
- Climatology
- Medical Physics
- Quantum Mechanics
- Radiation Biology
- Computational Physics
- Quantum Optics
- Thermonuclear and Statistical Mechanics
- Radiative and Nuclear Interactions

FACULTY OF SCIENCE | physics.mcmaster.ca
Psychology, Neuroscience and Behaviour

The Department of Psychology, Neuroscience and Behaviour (PNB) leads the study of psychological science, the nervous system and the brain, and behaviour in animals and humans. PNB’s undergraduate programs study psychological science, the nervous system and the brain, and behaviour in animals and humans. PNB’s undergraduate programs study neurological and mental health science, and behaviour in animals and humans.

FOCUS OF STUDY:
The Department offers two specializations: Mental Health and Music Cognition. As well, offered in collaboration with the Department of Biology, the following two programs are available: Honours B.Sc. in Biology and Psychology, Neuroscience and Behaviour, allows students the opportunity to merge leading edge knowledge from both fields, and, as a Honours B.A.Sc. in Neuroscience program, comprising research related to neurons and nervous systems.

The Honours B.A.Sc. in Neuroscience program prepares students to enter a work environment that requires an understanding of the determinants of human behaviour. Two specializations (Animal Behaviour & Social Behaviour and Early Childhood Education) offered in partnership with Mohawk College, allow students to graduate with both the Honours B.A.Sc. degree from McMaster University and a Graduate Certificate/Diploma from Mohawk College.

Students enrolled in a PNB program have an opportunity to explore a range of topics, including:

- Animal Behaviour
- Neuroscience
- Evolution and Social Behaviour
- Cognition and Perception
- Systems and Behavioural Neuroscience

AREAS OF RESEARCH:

- Animal Behaviour
- Cognition and Perception
- Developmental Psychology
- Evolution and Social Behaviour
- Neuroscience
- Systems and Behavioural Neuroscience

POSTGRADUATE OPPORTUNITIES:

Graduates from our programs are well prepared to apply to graduate programs in the following areas:

- Experimental Psychology
- Neuroscience
- Law
- Counseling
- Research and Clinical Psychology
- Administration of Business Administration
- Social Work
- Medicine

AREAS OF RESEARCH:

- Animal Behaviour
- Cognition and Perception
- Developmental Psychology
- Evolution and Social Behaviour
- Neuroscience
- Systems and Behavioural Neuroscience

LEVEL II PROGRAMS:

Honours B.Sc. Programs

- Honours Neuroscience
- Honours Psychology, Neuroscience and Behaviour
- Honours Psychology, Neuroscience and Behaviour - Mental Health Specialization
- Honours Psychology, Neuroscience and Behaviour - Music Cognition Specialization
- Honours Biology and Psychology
- Honours Neuroscience and Behaviour
- Honours Psychology, Neuroscience and Behaviour - Evolution and Social Behaviour
- Honours Psychology, Neuroscience and Behaviour - Cognition and Perception
- Honours Psychology, Neuroscience and Behaviour - Systems and Behavioural Neuroscience
- Honours Psychology, Neuroscience and Behaviour - Research and Clinical Psychology
- Honours Psychology, Neuroscience and Behaviour - Administration of Business Administration
- Honours Psychology, Neuroscience and Behaviour - Social Work
- Honours Psychology, Neuroscience and Behaviour - Medicine

LEVEL II PROGRAMS:

Honours B.A.Sc. Programs

- Honours Human Behaviour
- Honours Human Behaviour - Autism and Behavioural Science Specialization
- Honours Human Behaviour - Early Childhood Education Specialization

CAREERS:

Psychology, Neuroscience and Behaviour students develop a range of skills that are easily transferred to a wide range of careers. Graduates have pursued careers in the following areas:

- Animal Behaviour
- Music Cognition
- Neuroscience

DIRECT ENTRY PROGRAMS

FACULTY OF SCIENCE | pnb.mcmaster.ca
Faculty of Science
Level I Direct Entry Programs

In contrast to the Level I Gateway Programs, students enter directly into these programs and the first-year curriculum is a set of prescribed, required courses that must be completed before advancing to Level II of the program. Visit mapsci.ca to start planning your journey.

Honours Kinesiology
ADMISSION REQUIREMENTS (ONTARIO): Completion of the High School Diploma plus 6 Grade 12 U/M requirements, including:

- English
- Biology
- Calculus & Vectors
- Two of: Biology, Chemistry or Physics

Completion of all three is strongly recommended.
(*) A minimum of high 80s average is required for consideration.

Admission is by selection.

Medical Radiation Sciences
ADMISSION REQUIREMENTS (ONTARIO): Completion of the High School Diploma plus 6 Grade 12 U/M requirements, including:

- English
- Advanced Functions
- Calculus & Vectors
- Biology
- Chemistry

85-88%
60
MRS
Honours Integrated Science (iSci)

The Honours Integrated Science (iSci) program is the country’s most innovative undergraduate science program, blending content from across the discipline sciences, while focusing on the foundations of chemistry, earth science, life science, mathematics and physics. Our students learn in a variety of situations – from formal lectures and tutorials to inquiry-based team and individual research projects that involve hands-on laboratories and fieldwork. Integrated Science students learn to ask creative and critical questions using a wide range of tools. Most importantly they are taught to tackle real-world challenges that face us today and in the future.

WHAT MAKES ISCIOBJECTIVE?

- Integration of research and education spanning all disciplines of science
- Hands-on learning alongside leading researchers in state-of-the-art facilities
- Problem-based learning in small class settings
- Limited enrollment programs designed for highly motivated, high-achieving students
- Tutoring by teaching faculty and affiliated inter-disciplinary teams
- Opportunities to work closely with faculty members on research projects in laboratories and field settings
- Research collaborations and internships with government, industrial, and community partners
- Integrated scientific literacy component in which students learn and develop scientific writing and presentation skills, ethical approaches to research, and the effective use of library and internet resources
- Integrated learning of science allows students to understand how knowledge has accumulated within and across scientific disciplines, and how new scientific thought is created and communicated
- Completion of a Minor may also be considered

ADMISSION REQUIREMENTS (ONTARIO):

High School Graduates:
- English
- Advanced Functions
- Calculus & Vectors
- Two of: Biology, Chemistry or Physics. Completion of all three is strongly recommended.
- A minimum of high 80s average is required for consideration.

Travelling Abroad!

Integrated Science students have the option to go on an exchange to the University of Leicester in the United Kingdom in their third year.

- The University of Leicester is a member of the Old University Alliance of the leading scientific universities in the UK.

TRAVEL ABROAD!

ISCI WILL QUALIFY STUDENTS TO:

- Be ideally prepared to be future scientific leaders
- Pursue post-graduate scientific research, enter professional programs, or seek employment in leading research laboratories
- Be prepared to be future scientific leaders

DID YOU KNOW?

Only 60 students are enrolled each year, so you will get to know ALL of your classmates and be on a first-name basis with teaching faculty and staff.

McMaster University has over 3000 square feet of lab space, and is the first University lab in Canada to use neutrodine-filtered ductless space, and is the first University lab in Canada to use neutrodine-filtered ductless space.

In the first-year seminar class students have the option to go on an exchange to the University of Leicester in the United Kingdom in their third year.

- The University of Leicester is home to our sister program, the Natural Science program.
- Natural Sciences at Leicester features a very similar learning model to that at McMaster, and is well respected as one of the leading scientific universities in the UK.

SAMPLE ISCI TSA2 COURSE TIMETABLE

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
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<td>Seminar</td>
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Face-to-face seminars to think about field work, the local environment, and data collection outside the lab.

Travelling Abroad – will be presented by researchers, policy makers, and industry leaders – practicing scientists both within and outside McMaster.

FACULTY OF SCIENCE | science.mcmaster.ca/isci

MIS

ADMISSION AVERAGE

ANTICIPATED TARGET

(OUAC Application Code) 60

**Serves as a prerequisite for most Level II courses in Astronomy, Biochemistry, Biophysics, Biology, Biostatistics, Chemistry, Chemical Biology, Geography, Earth Sciences, Life Sciences, Mathematics, Medical Physics, Physics, Psychology, Neuroscience, & Behaviour & Statistics

ISCI WILL QUALIFY STUDENTS TO:

- Be ideally prepared to be future scientific leaders
- Pursue post-graduate scientific research, enter professional programs, or seek employment in leading research laboratories
- Be prepared to be future scientific leaders

DID YOU KNOW?

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Travelling Abroad – will be presented by researchers, policy makers, and industry leaders – practicing scientists both within and outside McMaster.

FACULTY OF SCIENCE | science.mcmaster.ca/isci

MIS

ADMISSION AVERAGE

ANTICIPATED TARGET

(OUAC Application Code) 60
Honours Kinesiology

McMaster’s Honours Kinesiology program is committed to the discovery, communication and application of knowledge through the multi-disciplinary study of human movement, exercise and the relationships between physical activity and health.

Our comprehensive curriculum engages students in experiential learning. Our undergraduate students are taught by outstanding faculty, have access to state-of-the-art teaching and research labs, and benefit from our active hands-on approach to learning.

FEATURES THAT DISTINGUISH OUR PROGRAM:
• The Honours Bachelor of Science Kinesiology degree recognizes our strong, science-based curriculum
• The quality of research being done by committed faculty members
• Enrolment limit of 220 students allows for small lectures and even smaller labs
• Flexibility of course selection for the completion of a minor in another area of interest
• Our engaged, enthusiastic Kinesiology Student Society fosters a healthy and successful academic learning environment

RESEARCH AREAS:
• Integrated Physiology
• Mechanics and Control of Movement
• Neuroscience and Behavour

Many Kinesiology professors undertake their research in the Physical Activity Centre for Excellence in Health Research (PACE). The centre is state-of-the-art and contains some of the most sophisticated exercise rehabilitation equipment in the world. The research laboratories and community programs provide opportunities for undergraduate students to gain both evidence-based practical and theory-based research experiences. www.science.mcmaster.ca/pace

ADMISSION REQUIREMENTS:
Compliance of the High School Diploma plus 6 Grade 12 U/M requirements, including:
• English
• Calculus and Vectors
• Biology
Note: Introductory Kinesiology (PSK4U) is strongly recommended.

87-90% 220 200 MV
AND/REQUIRED ADMISSION AVERAGE TARGET MV QUIC APPLICATION DEADLINE

CAREER OPPORTUNITIES FOR GRADUATES:
Our graduates are well prepared to continue their studies in many professional or graduate schools, including:
• Medicine
• Physiotherapy
• Chiropractics
• Occupational Therapy
• Dentistry
• Education
• Biomechanics
• Cardiac Rehabilitation
• Ergonomics
• Exercise Physiology

In addition to the careers associated with these professional and graduate programs, our graduates are well equipped to pursue careers in the following areas:
• Kinesiology
• Exercise Science
• Clinical Biomechanics
• Strength and Conditioning
• Occupational Health and Safety
• Exercise Rehabilitation

HONOURS KINESIOLOGY (Honours B.Sc. KIN.)
In this direct entry program, students begin the study of Kinesiology in first year.
The Five Kinesiology courses taken in first year are:
• KINESIOL 1A03 Human Anatomy and Physiology I
• KINESIOL 1E03 Motor Control and Movement
• KINESIOL 1K03 Foundations in Kinesiology
• MATH 1A03 Calculus for Science I
• MATH 1LS3 Calculus for the Life Sciences III

In second year, the Kinesiology courses include:
• Biomechanics
• Cardiorespiratory and Metabolic Exercise Physiology
• Health Psychology
• Growth, Maturation and Physical Activity in Children and Youth
• Musculoskeletal Anatomy
• Neuramenesocerebral Exercise Physiology

In third and fourth year, students will be able to choose from a list of over 30 Kinesiology courses while some students take their course selection toward their intended career path, others choose courses from across many sub-disciplines.

POPULAR AREAS OF STUDY INCLUDE:
• Biomechanics
• Exercise Metabolism
• Exercise Physiology
• Exercise Rehabilitation
• Motor Control and Learning

Our limited enrolment program offers an exceptional learning environment encompassing classroom, laboratory and fieldwork placement experiences. Graduates are well prepared for a wide variety of opportunities, ranging from direct entry employment as kinesiologists to further training in graduate, medical or professional schools. Our curriculum meets the core competency requirements for the College of Kinesiology in the province of Ontario.

Your Journey Starts Here.
Medical Radiation Sciences

Today, Medical Radiation Sciences is one of the fastest growing primary health care fields. In recent years, innovations in information technology, digital imaging and instrumentation have made it one of the most advanced, specialized and dynamic areas of health care today.

Medical Radiation Sciences involves the use of ionizing and non-ionizing radiation for diagnostic studies and the treatment of patients. Ionizing radiation includes X-rays and gamma rays; non-ionizing radiation includes magnetic fields and ultrasound. The collaboration between McMaster University and Mohawk College of Applied Arts and Technology gives students in the Medical Radiation Sciences program the best of both worlds.

HIGHLIGHTS OF THE BACHELOR OF MEDICAL RADIATION SCIENCES PROGRAMS:
• Common Level I program
• Three areas of specialization to choose from after Level I
• Four year (10 semester) integrated curriculum linking theory and clinical education
• Limited enrolment program allows for small class sizes
• Practice of pre-clinical skills in simulated skills labs
• Access to extensive medical imaging facilities, including enhanced radiography, computerized tomography and ultrasound
• Inter-professional courses combining students in all MRSc Specializations
• Three terms of clinical education allows for skills-based hands-on experience
• Graduates are eligible to write professional certification exams

CAREER OPPORTUNITIES FOR GRADUATES:
Medical Radiation Sciences graduates are well equipped to work in the following settings:
• Community and teaching hospitals
• Radiation Therapy practices
• Independent diagnostic imaging centers
• Research facilities
• Regional cancer centres

Students will also be prepared for postgraduate studies in diagnostic specialties, cardiology or ultrasound specializations.

ADMISSION REQUIREMENTS (ONTARIO):
• Completion of High School Diploma plus 8 Grade 12 U/M requirements, including:
  - English
  - Advanced Functions
  - Calculus & Vectors
  - Biology
  - Chemistry

85-88% ANNUAL ADMISSION AVERAGE

Medical Radiation Sciences: Radiation Therapy
Medical Radiation Therapists design treatment plans, place patients, administer radiation therapy and monitor the response of the patient to therapy. Therapists develop a supportive relationship with patients and their families, for example, they provide advice on side effects of radiation therapy and how to minimize these.

• Graduates are eligible to write professional certification exams

• Regional cancer centres
• Independent diagnostic imaging centres
• Research facilities
• Regional cancer centres

Medical Radiation Sciences: Radiography
Medical Radiation Technologists play a vital role in the diagnosis and treatment of many illnesses and injuries, using X-rays and other forms of electromagnetic energy. Examples include computerized tomography (CT) for accident victims with severe head injuries, or a barium meal study to examine the stomach and intestines.

• Graduates are eligible to write professional certification exams

• Regional cancer centres
• Independent diagnostic imaging centres
• Research facilities
• Regional cancer centres

Medical Radiation Sciences: Ultrasonography
Diagnostic Medical Sonographers use sound waves to generate an image which is used in the diagnosis and diagnosis of various medical conditions. As an example, we use ultrasound to study the fetus in the womb, to examine the liver and diagnose various medical conditions. We also obtain the blood flow in the veins and arteries through ultrasound imaging.

• Graduates are eligible to write professional certification exams

• Regional cancer centres
• Independent diagnostic imaging centres
• Research facilities
• Regional cancer centres

Program Structure for All Specializations (Beginning in Level II)

YEAR 1:
- Level I: Summer Term (Instruments Course)
- Level I: Clinical Practicum I

YEAR 2:
- Level II: Level II Summer Term
- Level II: Clinical Practicum II

YEAR 3:
- Level III: Clinical Practicum III

YEAR 4:
- Level IV: Clinical Practicum IV

Enrollment in these specializations is limited and admission is by selection but requires, as a minimum, completion of Medical Radiation Sciences I with a Fall/Winter Average of at least 5.0 and a Grade Point Average (GPA) of at least 3.5 in the following courses:

- MEDRADSC 1A03 Introduction to Medical Radiation Sciences
- MEDRADSC 1E03 Inquiry in Medical Radiation Sciences
- MATH 1A03 Calculus For Science I or MATH 1LS3 Calculus for the Life Sciences I
- KINESIOL 1Y03 Human Anatomy and Physiology I
- KINESIOL 1YY3 Human Anatomy and Physiology II
- BIOLOGY 1A03 Cellular and Molecular Biology
- ENESOL 1Y03 Human Awakenings and Philosophy II
- PHYS 1F03/1L03 Medical Imaging Physics

Note: All students will be required to act as simulated patients for their peers during skills laboratory classes and practice sessions.
Science Career and Cooperative Education

CAREER EDUCATION:
The Science Career and Cooperative Education (SCCE) office has a variety of resources to help students research and explore career and education opportunities they can pursue during and following their degree. Choosing a career is an involved process which requires that students reflect upon their interests, work style preferences, and values to determine a career path that best suits their short and long term goals. It can take several years to fully engage in a career. SCCE is committed to assisting students with the transition from school to work through:
- Career advising
- Cover letter and resume critiques
- Career information sessions and workshops
- Personal statement critiques
- Mock interviews

COORDERATIVE EDUCATION:
Cooperative Education is an integrated approach to higher education that enables highly motivated students to alternate academic terms with paid, relevant work experience. The term “cooperative education” emphasizes the partnership between the employer, students and McMaster University.

Cooperative education is “hands-on” education, extending the learning process beyond the classroom into the workplace by alternating academic terms with paid co-op work terms. Students will:
- Apply to Level II and begin co-op on Level III.
- Gradually work towards at least one year of work experience.
- Develop a network of valuable contacts and the skills to successfully transition into graduate studies or a career.

Current Faculty of Science Co-Op Programs:
- Actuarial and Financial Mathematics
- Biochemistry - Biomedical Research Specialization
- Chemical Biology
- Chemistry
- Earth and Environmental Sciences
- Environmental Sciences
- Life Sciences
- Mathematics and Statistics (including sub-plan)
- Medical and Biological Physics
- Molecular Biology and Genetics
- Physics
- Sustainable Chemistry

SCCE hosts Co-op Information Sessions in the Fall and Winter. Look for these events on OSCARplus to learn more about program options and the application process.

EXPEDIENT EDUCATION:
Experiential Education provides students with opportunity to gain real world, academically relevant experience in a community, research or professional setting. This combination of academic and applied learning helps students to further develop the necessary qualities and skills that will be transferrable to future career paths. Students in the Faculty of Science can gain experience through Applied Placement courses, Research Practicum courses, or Undergraduate Science Internships.

Applied Science Placement Courses
Upon finding an academically relevant experience, students must secure a relevant Placement and Academic Supervisor. With input from both supervisors, students complete an application form, including a detailed learning contract and evaluation matrix. Application forms must be submitted 30 days prior to the start date of classes for the term in which applying.

Research Practicum Courses
In this course, students will conduct research, as directed by a faculty member, in a wide range of scientific lab/field settings. The student will complete an academic component in addition to the research. These courses serve as excellent preparation for a Level IV Thesis or Independent Study experience. Students are responsible for securing an Academic Supervisor. Application forms must be submitted 30 days prior to the start date of classes for the term in which applying.

Undergraduate Science Internships
Students in Level II or III of an Honours program in the Faculty of Science have the opportunity to participate in a full-time, paid internship in an academically relevant setting. Internships allow students to explore potential career options, while gaining work experience, developing relevant skills and building contacts for future career planning.

Science Career and Cooperative Education

SCIENCE 2C00:
Skills for Career Success in Science
These non-credit courses, offered to students registered in Level I or above, are available in a variety of academic settings. The courses cover a wide range of scientific-skillfulness. Students will complete an academic component in addition to the research. These courses serve as excellent preparation for a Level IV Thesis or Independent Study Experience. Students must secure a relevant Placement and Academic Supervisor. With input from both supervisors, students complete an application form, including a detailed learning contract and evaluation matrix. Application forms must be submitted 30 days prior to the start date of classes for the term in which applying.

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TOPICS COVERED:
- Professionalism in the Workplace
- Resume/Cover Letter Writing
- Networking
- Job Search Strategies
- Interview Skills
- Career Planning
Science Tours

The Faculty of Science is one of the largest faculties at McMaster University with over 7,000 undergraduate and graduate students, seven Level I programs, and 39 programs, which begin in Level II. Applying to university and deciding on a program of study can be overwhelming. To help you make an informed decision, we invite you to participate in a Science Virtual Tour to see what the Faculty has to offer.

SCIENCE VIRTUAL TOURS:
Experience McMaster Science in an immersive digital environment. With both a guided-tour and self-guided tour option, all locations feature 360-degree visuals of each stop. The guided tour option gives students a glimpse of facilities and laboratories that a typical first-year Science student may experience. Selecting the self-guided tour allows visitors to see unique facilities, such as the Nuclear Reactor, Cell Biology Lab or Biointerfaces Institute, that upper-level students may encounter during their time at McMaster.

Explore McMaster Science through an online Virtual Tour at [science.mcmaster.ca/tour](http://science.mcmaster.ca/tour).