NUC ENG

Undergraduate Viewbook

Engineering Physics

McMaster University



AT THE CORE

Canada's Most Powerful University Research Reactor.

The McMaster Nuclear Reactor is a 5 MW open-pool research reactor that generates neutrons for ground-breaking research, advanced training, and life-saving medical isotopes

FROM REACTOR TO REAL-WORLD IMPACT

Controlled Nuclear Energy

A 5 MW open-pool reactor generates intense neutron flux, enabling advanced experiments in nuclear science and engineering.

Tools and Access

Work inside negative pressure containment systems, perform experiments in the reactor core, utilize some of Canada's newest hot cells to handle nuclear materials.

Hands-On Learning

Students don't just study nuclear systems, they work with them. Students develop the skills and knowledge from experiences in the reactor, not just from textbooks and lectures.

Global Impact

Advancing healthcare, powering clean energy, and enabling new technologies Nuclear Engineering shapes the future on a global scale.



NUCLEAR ENGINEERING STUDENTS

This could be you.

Nuclear Engineering applies the principles of **physics, chemistry and engineering** to the peaceful uses of **nuclear technologies** for the benefit of society. We **design, operate and innovate technologies** for a cleaner, healthier and more secure world.



WHAT MAKES NUCLEAR ENGINEERING AT MCMASTER DIFFERENT?

Canada's Nuclear Hub

Learn at the centre of Canada's nuclear innovation ecosystem, with direct connections to industry, research labs, and regulators.

Hands-On from Day One

At McMaster you won't just learn nuclear engineering, you will experience it through in-reactor experiments.

Power the Future

Be part of the global shift to clean energy through nuclear power, fusion and advanced reactor design.

Built for Impact

Develop the skills to solve real-world challenges in safety, sustainability, and energy security.

Our faculty and students are advancing the future of **clean, reliable energy** through **nuclear innovation.** At McMaster, you'll work at the intersection of engineering and physics to develop technologies in **nuclear power, advanced reactors, radiation applications, and energy systems** preparing you to **shape the future of the global nuclear technology sector.**

NucEng Level II: Build Your Foundation

FALL

ENGPHYS 2CD4
Computational Mechanics: Dynamics

ENGPHYS 2NE3
Thermal Systems Design

ENGPHYS 2E04
Analog and Digital Circuits

MATH 2Z03
Engineering Mathematics III

ENGPHYS 2NM3
Numerical Methods for Engineering

WINTER

ENGPHYS 2A04
Electricity and Magnetism

ENGPHYS 2P04
Computational Mechanics: Statics

NUCLST 2N03
Nuclear Technology & Society

MATH 2ZZ3
Engineering Mathematics IV

ENGINEER 2PX3
Engineering: Communications and Social Impact

By the end of Level II, you will have a strong foundation in:

- **Computational Methods**
- **Applied Physics**
- **Engineering Design**
- **Mathematical Modelling**

NucEng Level III: Advancing Core Knowledge

FALL

ENGPHYS 3ES3
Introduction to Energy Systems

ENGPHYS 3MB4
Embedded Systems

ENGPHYS 3W03
Signals and Systems for Engineering

NUCENG 3D04
Principles of Nuclear Engineering

MATLS 3M03
Mechanical Behaviour of Materials

WINTER

ENGPHYS 3CM4
Computational Multiphysics

ENGPHYS 3L04
Engineering Metrology

NUCENG 4P03
Nuclear Power Plant Systems and Operation

NUCENG 3004
Fluid Mechanics and Heat Transfer: Intro

ENGINEER 3PX3
Engineering Economics

NucEng Level IV: Powering Your Future

FALL

NUCENG 4RP4
Radiation Protection and Health Physics

NUCENG 4AN6 A
Nuclear Engineering Design and Synthesis Project

NUCENG 4FC3
Nuclear Fuel Cycles and Waste Management

ENGINEER 4A03
Ethics, Equity and Law in Engineering

NUCENG 4TH4
Fluid Mechanics and Heat Transfer: Nuclear Thermalhydraulics

WINTER

NUCENG 4NE3
Advanced Nuclear Engineering

NUCENG 4AN6 B
Nuclear Engineering Design and Synthesis Project

NUCENG 4D04
Nuclear Reactor Physics

MATLS 4ME3
Material Degradation in Nuclear Environment

6-8 units of Approved Technical Electives

Did you know? Students will do experiments in McMaster's Nuclear Reactor.

What is nuclear engineering?

The application of engineering design, scientific knowledge, computer modeling, application and safety of nuclear technologies for the benefit or peaceful use of nuclear energy.

What role does nuclear engineering play in the real world?

We work to design, build and operate systems that utilize radiation and nuclear reactions in a safe and effective way to obtain the maximum benefits of these technologies for all of humankind.

A combination of the theory and application of modern physics.

Courses cover a broad range of skills, which are in demand across all areas of applied nuclear technology including nuclear power, imaging, medical isotopes, space applications, and sustainability.

What can I learn?

Nuclear

Canadian Nuclear Laboratories
Laboratoires Nucléaires Canadiens
ONTARIO POWER GENERATION
Bruce Power
Innovation at work

Top 3 Co-op

Energy-specific curriculum

1. Nuclear engineering and design
2. Energy systems
3. Nuclear materials
4. Reactor physics
5. Fuel performance and fuel cooling

Core curriculum

1. Electricity and magnetism.
2. Thermodynamics.
3. Classical mechanics.
4. Electronic devices and circuit design.
5. Computer modeling and signal processing.
6. Applied mathematics.
7. Engineering design.

CO-OP

McMaster has one of the largest engineering co-op programs in Canada

Students have the freedom to design their own path enabling balance among academic interests, research opportunities, and workforce placements.

Flexible co-op options allow students to complete terms of 4, 8, 12 or 16 months in a row.

Earn money and gain experience while working towards your degree.

McMaster Engineering co-op students have worked in over **30** countries around the world

96% of students felt their company provided them with a rewarding work environment

93% of students graduate with co-op experience

Average wage for students **$35/h**

4,700+ work terms completed annually

THIS COULD BE YOU!

Willow completed a 4-month research co-op through the Canadian Nuclear Laboratories (CNL) Undergraduate Summer Research Experience in collaboration with McMaster University.
Willow's co-op experience included spending two weeks at **Chalk River Laboratories.**



"Through my co-op experience, I had the opportunity to work on my project "MAD MAX" with the Clancy Group. This was the study of hydrogen accumulation in zirconium alloys using neutron and X-ray diffraction as complementary analysis techniques."

"I had a wonderful summer research experience, and the visit to Chalk River Labs was a highlight. It was so valuable to work one-on-one with my research mentor at CNL and to experience working in the industry.
The scope of the research done at CNL Chalk River touched on each student's individual research area. So, I learned a lot about nuclear research."

— Willow Paraskevas

Some of the nuclear

COMPANIES

where our alumni and co-op students work



HITACHI

OPG

framatome



Canadian Nuclear Laboratories | Laboratoires Nucléaires Canadiens

nwmo

NUCLEAR WASTE MANAGEMENT ORGANIZATION

Bruce Power™

BWXT®

BWX Technologies, Inc.



AtkinsRéalis



Conexus

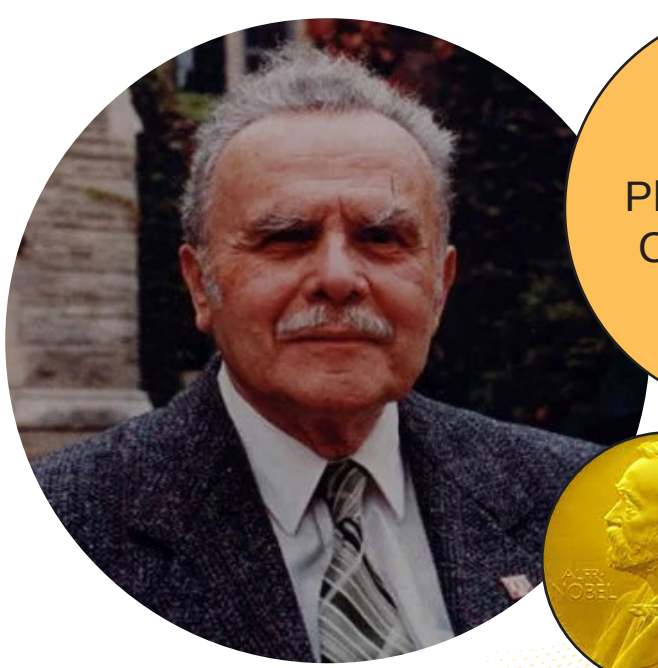
HATCH

Honouring our Laureate

BERTRAM BROCKHOUSE

1994 NOBEL PRIZE LAUREATE

For pioneering contributions to the development of neutron scattering techniques



McMaster
Physics Alumni
Class of 1941

BRIGHTER
WORLD

@macnuceng

@naygn_mcmaster

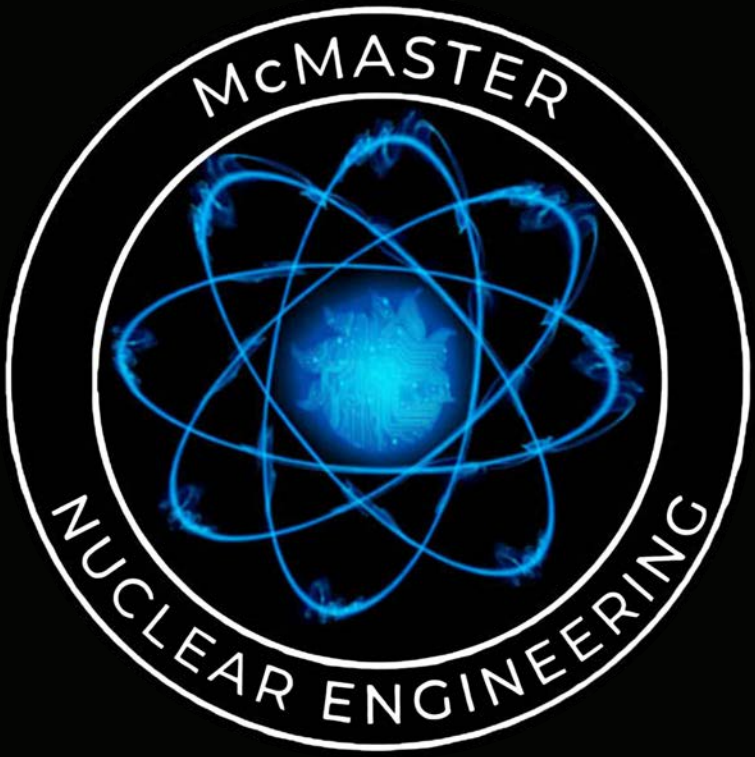
Visit the Nuclear Engineering site:



Scan Here

NOTES:

"No other nuclear engineering in program can offer the vast arry of hands-on and experienetial learning that we can provide through the McMaster Nuclear Reactor and all of our other unique infrastructure."
- Dr. Dave Novog


McMASTER
NUCLEAR ENGINEERING