

# Aerospace Engineering

## PhD/MASc/MEng

RYERSON  
UNIVERSITY

School of Graduate Studies  
[www.ryerson.ca/graduate](http://www.ryerson.ca/graduate)

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# Aerospace Engineering

## PhD / MASc / MEng

Aircraft design, development and production have been part of Toronto's history for over 85 years. Canada's first aircraft factory opened in Toronto in 1915. Since that time, 11,200 aircraft have been delivered to customers in more than 100 countries.

Ryerson University's Department of Aerospace Engineering is located in the George Vari Engineering and Computing Centre; a state-of-the-art building that opened in 2004 and is located in the heart of downtown Toronto. The department has an esteemed reputation among the aerospace community, due in part to its contribution to the development of strategic plans for promoting the health and growth of aerospace on provincial and national levels.

This program focuses on the intellectual development of graduate students within the field of aerospace engineering. Students will further develop critical and independent thinking throughout the wide spectrum of graduate courses offered.

### **Program Mission:**

- To better enable students to realize potential upon graduation by providing excellent education and experience within the realm of aerospace engineering.
- To bring relevance to the program through strong interaction with the aerospace industry with respect to both education and research.
- To conduct significant, internationally recognized research across a spectrum of key areas that are of importance to the aerospace community within Canada.

# Requirements & Curriculum

## **Doctor of Philosophy (PhD)**

The PhD program requires the successful completion of four one-term graduate courses, passing a qualifying/candidacy examination and a dissertation based on original research. The student must submit course selections and the dissertation research proposal in writing for approval by the supervisor. The supervisor, after consultation with the student, will recommend the appointment of a Supervisory Committee to the Program Director. Within 20 months of initial registration, every student in the PhD program will undertake an oral and written candidacy examination. The core aspect of the program is the successful defense of the doctoral dissertation at both Program and School of Graduate Studies oral examinations.

## **Master of Applied Science (MASc)**

The MASc program requires the successful completion of five one-term course credits and a research thesis. No undergraduate credits may be taken towards the degree. No less than two of the required five courses must be taken at Ryerson University. The supervisor for each graduate student must approve the graduate course selection. The supervisor must also approve the proposed thesis plan, which will be presented in writing by the student. Course selections are normally confirmed through a Program of Study agreement between supervisor and student, with the approval of the Director. An oral presentation of the research thesis, and results, will be arranged in a seminar format. The examination committee will assess the candidate's research thesis.

### **Master of Engineering (MEng)**

The MEng program requires the successful completion of eight one-term courses and a major project. No undergraduate credits may be taken towards the degree. No less than four of the required eight courses must be taken at Ryerson University. The faculty advisor for each graduate student must approve the graduate course selection. The faculty advisor must also approve the proposed project plan, which will be presented in writing by the student. Course selections are normally confirmed through a Program of Study agreement between supervisor and student, with the approval of the Director. An oral presentation of the project report, and results, will be arranged in a seminar format. The examination committee will assess the candidate's project report. There is also a course-only option available where students may apply to substitute two courses for the major project.



# Research Fields

Applicants may choose one of the following research fields:

- Aerodynamics and Propulsion (AP)
- Aerospace Structures and Aerospace Manufacturing (ASAM)
- Avionics and Aerospace Systems (AAS)

## **Aerodynamics and Propulsion Group (AP)**

**Areas of Research:** Nonlinear Aeroelasticity, Propulsion System Research, Cooling of Gas Turbine Components, Thermal Management in Aerospace Systems, Wind Turbines, CFD Algorithms, Applied Aerodynamics Research, and Inverse Design of Transonic Blades.

**Research Facilities:** Propulsion Research Facility, Aero-Thermal Management Laboratory, Large Subsonic Wind Tunnel, High-Speed Gasdynamics Laboratory, and Aerospace Computational Laboratory.

## **Aerospace Structures and Aerospace Manufacturing Group (ASAM)**

**Areas of Research:** Characterisation, Modeling and Analysis of Aerospace Advanced Materials and Structures in Design and Manufacturing, Computational Methods in Composite Airframes, Laser Micro Machining, and Manufacturing and Automation.

**Research Facilities:** FRAMES Components and Materials Testing Facility, Aerospace Biomechanics Laboratory, and Aerospace Stress Analysis Laboratory.

## **Avionics and Aerospace Systems Group (AAS)**

**Areas of Research:** Optimization of UAV System Design, Space Avionics and Instrumentation, Spacecraft Dynamics and Control, Control Systems Development for Robotics and Aerospace Systems, Advanced Aerospace Vehicle Dynamics, and Innovative Computer Vision Algorithms for Unmanned Space Operations.

**Research Facilities:** Space Avionics and Instrumentation Laboratory (SAIL), Aerospace Vision Management Lab, Aerospace Systems and Control Laboratory, Avionics and Systems/Flight Mechanics Laboratory, and Ryerson Satellite Attitude Control Experiment (RACE).

# Admission

## Doctor of Philosophy (PhD)

Applicants to the PhD program must have completed a Master's program in Aerospace Engineering, or a related Engineering or Applied Science field, from a recognized university. A Master's degree with a minimum B+ average or equivalent and demonstrated research capabilities are required. Two letters of reference are required; at least one of which must be from a former professor.

## Master of Applied Science (MASc)

### Master of Engineering (MEng)

Applicants to the Master's program must have completed a four-year baccalaureate degree in Aerospace Engineering, or a related Engineering or Applied Science field, from a recognized university. Applicants to the MASc program must have a minimum B+ average or equivalent in the last two years of study and a demonstrated capacity to succeed in the graduate program. Applicants to the MEng program must have a minimum B average or equivalent in the last two years of study and a demonstrated capacity to succeed in the graduate program. Two letters of reference are required; at least one of which must be from a former professor.

## International Students

International Services for Students (ISS) provides support services for registered international students and promotes international awareness to the Ryerson community. For more information on ISS, visit [www.ryerson.ca/student-services/international-services](http://www.ryerson.ca/student-services/international-services).

## English Language Proficiency Requirement

Applicants whose language of instruction during their undergraduate studies was a language other than English are required to submit a test of English language proficiency. For more information on acceptable standard tests and score requirements, visit [www.ryerson.ca/graduate/admissions](http://www.ryerson.ca/graduate/admissions).

## Additional Information

For detailed program information, visit [www.ryerson.ca/graduate/aerospace](http://www.ryerson.ca/graduate/aerospace).

## Program Contact Information

Telephone: 416-979-5000, ext. 2790  
E-mail: [aerograd@ryerson.ca](mailto:aerograd@ryerson.ca)

## Financial Support

Full-time PhD and MASc students are eligible to compete for a number of scholarships offered by Ryerson University, as well as graduate and research assistantships. Financial support for all candidates is considered as part of the application process. Students are encouraged to apply for scholarship support from the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Province of Ontario (Ontario Graduate Scholarships). For more information on available funding, visit [www.ryerson.ca/graduate/funding](http://www.ryerson.ca/graduate/funding).

## How to Apply

Application forms and instructions are available at [www.ryerson.ca/graduate/admissions](http://www.ryerson.ca/graduate/admissions).

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