

# Civil Engineering

MASc/MEng/PhD

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# Civil Engineering

This unique multi-disciplinary program prepares highly qualified graduate students for active roles in enhancing the nation's economic, environmental and social development. Emphasis is placed on combining both traditional methods and the latest innovative technologies to enable students to broaden their expertise with a variety of challenging problems.

## Research Areas

### Environmental Engineering

- Anaerobic digestion
- Biogas production
- Bioaccumulations of toxins in aquatic space
- Eco-hydrology and eco-hydraulic engineering
- Green engineering
- Industrial oil/chemical spill management
- Innovative wastewater treatment technologies
- Modelling of watershed and landfill design
- Resources recovery from wastes
- Urban storm water management practices
- Urban water and waste systems

### Geomatics Engineering

- Big geospatial data analytics for smart cities
- Multi-sensor integration for mobile mapping and intelligent transportation systems
- Photogrammetry, 3D imaging, deformation monitoring and metrology
- Real-time and collaborative geographical information systems
- Remote sensing and image processing (e.g., automated object extraction and LiDAR data processing)
- Satellite positioning and navigation
- 3D/4D city modelling, building information management and visualization
- UAV sensor integration and real-time mapping

### Transportation Engineering

- Disruptive/transformational transportation technologies and services
- Highway design
- Intelligent transportation systems
- Road safety and human factors
- Traffic operations/control/management
- Transportation planning
- Travel demand and behavior
- Transportation informatics

### Geotechnical Engineering

- Design and risk mitigations of urban tunneling
- Geotechnical characteristics of glacial deposits
- Ground improvement techniques
- Reliability design of geo-structures

### Construction and Infrastructure Management

- Asset management
- Infrastructure resiliency
- Project management
- Risk and reliability

### Structural Engineering

- Aggregate reactions: Oxidation of sulphide minerals and alkali-aggregate reactions
- Applications of advanced composite materials
- Behavior of structures and properties of concrete materials
- Bridge design, construction, repair and rehabilitation
- Deterioration and rehabilitation of infrastructures
- Earthquake-resistant steel buildings with self-centering systems/materials
- Development of test methods for concrete durability
- High-performance concrete and reactive powder concrete
- Offshore structures
- Performance-based design of concrete-liquid-containing structures including liquid-structure-soil interaction effects
- Response of structures to wind actions
- Seismic analysis, design and performance-based assessment
- Strength of steel and composite concrete-steel members
- Structural health monitoring
- Sustainable development of self-consolidating concrete
- Tall building and long-span bridge aerodynamics
- Thunderstorm wind speeds suitable for structural design
- Use of industrial by-products in concrete and asphalt

## Admissions Information

### MASc and MEng

- Completion of a 4-year bachelor's degree in civil engineering or a related discipline
- Minimum GPA or equivalent of 3.00/4.33 (B) in the last two years of study
- Two letters of recommendation, one of which must be academic

### PhD

- Completion of a master's degree in a related engineering or applied science discipline
- Minimum grade point average (GPA) or equivalent of 3.33/4.33 (B+)
- Two academic letters of recommendation

Applicants may be required to provide certification of English language proficiency. For more information, visit [ryerson.ca/graduate/futurestudents/admissions/english-language.html](http://ryerson.ca/graduate/futurestudents/admissions/english-language.html).



**“Ryerson’s Civil Engineering program has not only given me the opportunity to learn and explore the world of engineering, it has also provided me with the tools and the confidence I need to pursue my career ambitions.”**

– Gregory Richards, MASc student

### **International Students**

International Student Services (ISS) provides comprehensive support for the international student community at Ryerson.

[ryerson.ca/internationalservices](https://ryerson.ca/internationalservices)

### **Program Contact**

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