

# Building Engineering (BLDG)

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## Building Engineering (BLDG) Courses

### BLDG 5101 [0.5 credit]

#### Introduction to Building Engineering

Broad introductory and multi-disciplinary coverage of building engineering, with particular emphasis on building performance, heritage conservation, fire safety, and structures. Core competencies including research skills, communication of building engineering topics. Advanced methods for building design and restoration in the architectural, engineering, and construction field.

### BLDG 5102 [0.5 credit]

#### Introduction to Research Methods

Broad introduction to theory and application of research methods in engineering. Key areas include conducting literature reviews; field, laboratory, and computational techniques; and designing, conducting, and presenting research.

Prerequisite(s): Enrolment in M.Eng. Building Engineering.

### BLDG 5103 [0.5 credit]

#### Advanced Research Methods for Building Engineering

Broad set of technical and non-technical research skills to design, conduct, and publish research focused on building engineering. Key areas: defining research problems; literature reviews; methods to conduct research; inferential statistics; measurement and error analysis; design of experiments; presenting and publishing in scientific venues.

Prerequisite(s): enrollment in MASc Building Engineering, PhD Building Engineering, or BLDG 5702.

### BLDG 5104 [0.5 credit]

#### Indoor Environmental Quality

Indoor environmental quality (air quality, thermal, visual, and acoustic comfort); physical and chemical parameters for characterization. Types and sources of indoor air pollution and discomfort; measurement techniques. Heating, ventilation, air conditioning, lighting practices and issues. Modeling of and design for indoor environmental quality.

Precludes additional credit for ENVE 4106.

Also offered at the undergraduate level, with different requirements, as ACSE 4106, for which additional credit is precluded.

### BLDG 5201 [0.5 credit]

#### Advanced Building Characterization, Conservation and Rehabilitation Heritage

Supporting concepts and techniques for the identification, documentation, and conservation of heritage and existing buildings; advanced workshops by experts from key disciplines and practice areas in heritage conservation.

Includes: Experiential Learning Activity

Also listed as CIVE 5603.

### BLDG 5202 [0.5 credit]

#### Structural Assessment of Historic Buildings

General concepts related to conservation of heritage structures; materials, construction techniques and structural components; classical structural analysis approaches; seismic behaviour, damage and collapse mechanisms of historic buildings; modern conservation criteria and practical implementation of repair or strengthening strategies.

Also listed as CIVE 5202.

### BLDG 5203 [0.5 credit]

#### Advanced Computational Modeling Strategies of Historic Buildings

Introduction to conservation engineering; commonly used construction materials in historic buildings and their constitutive laws; Graphical and numerical methods to analyze masonry arches; Theory and application of discrete element method and its applications to assess masonry buildings.

Also listed as CIVE 5210.

### BLDG 5301 [0.5 credit]

#### Building Energy Management and Optimization

Fault detection and diagnostics; preventive and predictive maintenance; predictive and adaptive control of indoor climate; advanced sensing technologies for the built environment; analysis and modelling using data from buildings; data mining; linear and generalized linear models; optimization methods; model selection and validation; inverse modelling.

### BLDG 5302 [0.5 credit]

#### Building Services Engineering

How buildings are designed and operated. The materials provide foundational knowledge to understand building services: mechanical, electrical, plumbing systems with associated controls.

Precludes additional credit for ENVE 4107.

Also offered at the undergraduate level, with different requirements, as ACSE 4107, for which additional credit is precluded.

### BLDG 5900 [1.0 credit]

#### M.Eng. Project

Includes: Experiential Learning Activity

**BLDG 5906 [0.5 credit]**

**Directed Studies**

Supervised by a faculty member, students enrolled in this course will undertake a research project. A final report will be evaluated in determining the course grade.

Prerequisite(s): Open only to students in a Building Engineering Master's program.

**BLDG 5909 [2.5 credits]**

**M.A.Sc. Thesis**

**BLDG 6901 [0.5 credit]**

**Thesis Proposal**

**BLDG 6906 [0.5 credit]**

**Directed Studies**

Supervised by a faculty member, students enrolled in this course will undertake a research project. A final report will be evaluated in determining the course grade.

Prerequisite(s): Open only to students in the Building Engineering Ph.D. program.

**BLDG 6909 [0.0 credit]**

**Ph.D. Thesis**