Area of Interest: Engineering and Architecture

Bachelor of Building Science (Honours) (Co-op)

Honours Degree  Academic Year: 2020/2021
4 Years  Program Code: 1512X03FWO
Ottawa Campus

Our Program

Experience current and emerging technologies in Canada’s only Bachelor of Building Science program.

The four-year Bachelor of Building Science (Honours) degree program is designed to give you a broad knowledge base related to building environments. It covers all facets of building design, construction, human comfort and sustainability. It is Canada’s only Bachelor of Building Science program.

The small class sizes of the program allow you and your peers to form tight-knit working groups and build effective communication skills necessary to succeed in the industry. You will spend approximately one third of your time working in the labs, developing your skills. You also have the opportunity to gain industry experience from site visits, professors who are actively working in the field and two mandatory paid cooperative education (co-op) terms.

As a student in the program, you learn skills specific to architecture, construction methodologies, building envelopes, sustainability and other areas such as:

• science and engineering principles, professionalism and methodologies
• fundamentals of mathematics, technical writing, computer applications
• building frames and structures, geotechnical engineering, and materials science
• sustainable design, botany, renewable energy, urban planning and building information modeling
• business fundamentals, project planning and management, research and leadership skills

If you have a recognized Advanced Diploma in Architectural Technology or Civil Engineering Technology, you may be eligible to enter the third year of study. If you have a recognized Diploma in Architectural Technician, Construction Engineering Technician, or an Advanced Diploma in Mechanical Engineering Technology you may be eligible to enter into the second year with advanced standing. See the Bachelor of Building Science (Honours) Entry into Level 5 and Bachelor of Building Science (Honours) Entry into Level 3 bridging programs for details.

Graduates may find work as a(n):

• building scientist
• architectural or construction project manager
• energy consultant
• building inspector
• researcher
• junior analyst
• technical staff member with engineering firms or government agencies
Graduates of this program may also pursue further study in a variety of graduate credentials, such as Algonquin College’s Energy Management Ontario College Graduate Certificate, or pursue a Master’s degree in Building Science.

SUCCESS FACTORS

This program is well suited for students who:

• Appreciate the role of mathematics and applied science in the development of engineering solutions.
• Can work independently and contribute to problem-solving teams.
• Like to use drawings and spatial reasoning to visualize possibilities.
• Are inquisitive about the reasoning behind the choices and decisions made during building construction.
• Enjoy the challenge of researching and testing building methods and materials.
• Are interested in working with individuals who offer diverse perspectives.

Employment

Graduates may work in architects offices, engineering firms, contracting companies and government agencies and departments as researchers, junior analysts, project officers, building specialists, technical staff, architectural and construction project team leaders and consultants.

Learning Outcomes

The graduate has reliably demonstrated the ability to:

• Integrate sustainable building practices and alternative energy solutions and present options that balance client specifications, site conditions, and human factors.
• Use sound, acceptable engineering principles for the solution and documentation of situations encountered during the construction or rehabilitation of buildings.
• Communicate effectively with all project stakeholders.
• Read, interpret, and, with direction, modify documents related to building plans, including working drawings that involve structural, electrical, and mechanical features.
• Formulate strategies for the efficient and effective commissioning and operation of buildings and building systems.
• Evaluate the practical applications of primary and secondary theoretical research related to existing and emerging construction methods and materials.
• Analyze, test, and comment on the functionality of alternative structural, mechanical, and electrical solutions proposed for integration in both new projects and renovations.
• Contribute to the on-going economic viability of construction and engineering projects through the application of principles of estimating, accounting, and cost controls.
• Facilitate partnerships and productive interactions within project teams that involve knowledge-workers and skilled trade workers.
• Ensure work, activities, and practice are in compliance with established ethical and professional standards, as well as local, provincial, and national legislation.
• Adapt to changes in employment requirements through the development, implementation, and updating of professional and personal development plans.
• Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship.
Program of Study

<table>
<thead>
<tr>
<th>Level: 01</th>
<th>Courses</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>BSCI100 Introduction to Building Science</td>
<td>42.0</td>
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<tr>
<td></td>
<td>CON100 Space and Place: Site Development and Built Environments</td>
<td>42.0</td>
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<tr>
<td></td>
<td>DAT100 Computer Applications for Design and Reporting I</td>
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<td></td>
<td>DSN1200 Building Design Processes</td>
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<td>ENL1100 Communications and Academic Writing</td>
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<td>MAT6443 Calculus I</td>
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<tr>
<td>Level: 02</td>
<td>Courses</td>
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<td></td>
<td>CAD1200 Computer Applications for Design and Reporting II</td>
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<td></td>
<td>ELE1200 Electricity and Power Generation Fundamentals</td>
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<td>MAT8202 Calculus II</td>
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<td></td>
<td>PHI1000 Logic and Critical Thinking</td>
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<td>SCI1200 Materials Science</td>
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<td>Level: 03</td>
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<tr>
<td></td>
<td>BSC2100 Building Frame and Structural Studies</td>
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<td>ENG1100 Thermodynamics</td>
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<td>ENG2100 Geotechnical Engineering</td>
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<td>ENL8810 Technical Communications</td>
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<td>GEP1001 Cooperative Education Readiness</td>
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<td>MAT8204 Differential Equations</td>
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<td>SOC2000 Introduction to Sociology</td>
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<td>Level: 04</td>
<td>Courses</td>
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<tr>
<td></td>
<td>BSC2300 Applied Numerical Methods</td>
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<td>CON2200 Business Development for the Construction Industry</td>
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<td>CON3200 Seminar in Constructability</td>
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<td>DSN2200 Sustainable Design</td>
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**Elective: choose 1 Courses**

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENL4100 Creative Writing</td>
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</tr>
<tr>
<td>ENL4200 New Worlds and Alternative Realities: Speculative Fiction</td>
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<tr>
<td>PHI4000 Philosophy and Popular Culture</td>
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<tr>
<td>PHI4002 The Philosophy of Drugs</td>
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<tr>
<td>PHI4003 The Philosophy of Love and Sex</td>
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<td>PHI4004 Technology, Society and the Environment</td>
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<td>PHI4100 Survival in the Information Age: Risk and the Media</td>
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<td>PHY4000 Black Holes, Big Bangs and the Cosmos</td>
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<td>SOC4000 Criminology</td>
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<td>SOC4001 Global Perspectives</td>
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**Co-op: 01 Courses**

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<th>Course</th>
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<td>WKT2500 Work Term I</td>
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**Level: 05 Courses**

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<td>BSC2200 Building Systems</td>
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<tr>
<td>BSC3100 Renewable Energy</td>
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<tr>
<td>GEO2300 Principles of Urban Planning</td>
<td>56.0</td>
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<tr>
<td>MAT8205 Statistics and Probability</td>
<td>42.0</td>
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<tr>
<td>MGT3100 Introduction to Construction Project Management</td>
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**Level: 06 Courses**

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<tr>
<th>Course</th>
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<tr>
<td>BIO2200 Botany</td>
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<td>BSC3200 Alternative Energy</td>
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Bachelor of Building Science (Honours) (Co-op)

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<tbody>
<tr>
<td>BSC3300</td>
<td>Energy Conservation and Auditing</td>
<td>42.0</td>
</tr>
<tr>
<td>CAD3200</td>
<td>Building Information Modeling</td>
<td>42.0</td>
</tr>
<tr>
<td>ENG3100</td>
<td>Heat Transfer</td>
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**Co-op: 02 Courses**

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<td>WKT3500</td>
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**Level: 07 Courses**

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<tbody>
<tr>
<td>BSC4100</td>
<td>Applied Energy Management</td>
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<tr>
<td>BSC4200</td>
<td>Professional Portfolio Development</td>
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<tr>
<td>BSC4300</td>
<td>Building Science Research Project I</td>
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<tr>
<td>CAD4100</td>
<td>Energy Modelling and Simulation</td>
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**Level: 08 Courses**

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<tr>
<td>BSC4350</td>
<td>Building Science Research Project II</td>
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<td>BSC4400</td>
<td>Seminar in Sustainable Solutions</td>
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<tr>
<td>CON4200</td>
<td>Construction Methods for Renovation and Rehabilitation</td>
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</tr>
<tr>
<td>MGT4200</td>
<td>Scenarios in Team Leadership</td>
<td>28.0</td>
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**Fees for the 2020/2021 Academic Year**

Tuition and related ancillary fees for this program can be viewed by using the Tuition and Fees Estimator tool at [https://www.algonquincollege.com/fee-estimator](https://www.algonquincollege.com/fee-estimator).

Further information on fees can be found by visiting the Registrar’s Office website at [https://www.algonquincollege.com/ro](https://www.algonquincollege.com/ro).

Fees are subject to change.

Additional program related expenses include:
Books and supplies cost approximately $1,200 per academic term. Supplies can be purchased at the campus store. See [http://www.algonquincollege.com/coursematerials](http://www.algonquincollege.com/coursematerials) for more information about books.

Students are expected to purchase CSA-approved safety footwear and safety glasses, which are required at the start of the term.

**Admission Requirements for the 2021/2022 Academic Year**

**College Eligibility**

- Ontario Secondary School Diploma (OSSD) or equivalent.

- Mature students are applicants who have not achieved the Ontario Secondary School Diploma (OSSD) or its equivalent and who are at least 19 years of age on or before the commencement of the program in which they intend to enroll. Mature students applying for Degree programs satisfy College Eligibility by having demonstrated academic abilities equivalent to those of Ontario high school graduates, verified by successful completion of at least one full-time term at the post-secondary level (minimum five courses taken concurrently in an academic program of study).

**Program Eligibility**

- Six Grade 12 university (U) or university/college (M) courses with a minimum 65% average including:
  - One Grade 12 U English course, with a minimum of 70%.

- Please note that mature students must meet the following subject-specific Program Eligibility requirements, either directly or through equivalencies.

**Admission Requirements for 2020/2021 Academic Year**
College Eligibility

- Ontario Secondary School Diploma (OSSD) or equivalent.
- Mature students are applicants who have not achieved the Ontario Secondary School Diploma (OSSD) or its equivalent and who are at least 19 years of age on or before the commencement of the program in which they intend to enroll. Mature students have demonstrated academic abilities equivalent to those of Ontario high school graduates, verified by successful completion of courses at the postsecondary level.

Program Eligibility

- A minimum of six Grade 12 university (U) or university/college (M) courses.
- The six Grade 12 credits to include:
  - one Grade 12 U English course,
  - one Grade 12 U Mathematics course,
  - one Grade 12 U Science course (Physics preferred).
- A grade of 70% in the required courses and an overall average of 65% in the six Grade 12 U, or M courses. (Ontario Academic Courses (OAC) can replace or be used in combination with U or M courses.)

  **Requirements for Mature Students:**
  Grade 12 U or OAC English, Grade 12 U or OAC Mathematics and Grade 12 U or OAC Science. Minimum grade of 70% required in each course.

  - International applicants must provide proof of the subject specific requirements noted above along with proof of either: (IELTS / TOEFL) IELTS-International English Language Testing Service (Academic) Overall band of 6.5 with a minimum of 6.0 in each band; OR TOEFL-Internet-based (iBT)-overall 88, with a minimum of 22 in each component: Reading 22; Listening 22; Speaking 22; Writing 22.
  - Applicants with international transcripts must provide proof of the subject specific requirements noted above and may be required to provide proof of language proficiency.

Application Information

**BACHELOR OF BUILDING SCIENCE (HONOURS) (CO-OP)**

**Program Code 1512X03FWO**

Applications to full-time day programs must be submitted with official transcripts showing completion of the academic admission requirements through:

ontariocolleges.ca  
60 Corporate Court  
Guelph, Ontario N1G 5J3  
1-888-892-2228

Students currently enrolled in an Ontario secondary school should notify their Guidance Office prior to their online application at  http://www.ontariocolleges.ca/  .

Applications for Fall Term and Winter Term admission received by February 1 will be given equal consideration. Applications received after February 1 will be processed on a first-come, first-served basis as long as places are available.

International applicants please visit this link for application process information:  https://algonquincollege.force.com/myACint/  .

For further information on the admissions process, contact:

Registrar’s Office  
Algonquin College  
1385 Woodroffe Ave  
Ottawa, ON K2G 1V8  
Telephone: 613-727-0002  
Toll-free: 1-800-565-4723  
TTY: 613-727-7766
Additional Information

Programs at Algonquin College are Bring Your Own Device (BYOD). To see the BYOD requirements for your program, please visit: https://www7.algonquincollege.com/byod/

Algonquin College has been granted consent by the Minister of Training, Colleges and Universities to offer this applied degree for a seven-year term starting September 12, 2012. The College shall ensure that all students admitted to the above-named program during the period of consent have the opportunity to complete the program within a reasonable timeframe.

TRANSFER CREDIT RECOGNITION:
Applicants with degrees or degree level courses from Canadian institutions empowered to award degrees and from other degree granting institutions recognized by the Ontario Ministry of Training, Colleges and Universities (MTCU) are assessed on a case-by-case basis. To receive a course credit, a minimum grade of C (65%) is required. Official transcripts and course descriptions/outlines must be presented with the application for credit recognition. Applicants with degrees or degree level courses from countries other than Canada or from postsecondary institutions not recognized by the MTCU must have their degrees evaluated by a recognized Canadian public or private institution that specializes in the evaluation of international degree programs. MTCU must have their degrees evaluated by a recognized Canadian public or private institution that specializes in the evaluation of international degree programs.

ADVANCED STANDING:
Graduates from one of the following Ontario College Diplomas with the noted Grade Point Averages are eligible to bridge directly into semester three (year 2) of the eight semester (4 year) Bachelor of Building Science (BBS) Degree program: Architectural Technician, Ontario College Diploma with an overall GPA of 2.7 (70%) minimum or Construction Engineering Technician, Ontario College Diploma with an overall GPA of 2.7 (70%) minimum or Mechanical Engineering Technology, Ontario Diploma with an overall GPA of 2.7 (70%) minimum. Students who have completed the Architectural Technician or Construction Engineering Technician Ontario College Diploma programs are strongly recommended to complete an Integral calculus course or equivalent. (* a bridging course is required and will be added to the students Level 03 course load.)

Graduates from one of the following Ontario College Advanced Diplomas with the noted Grade Point Averages are eligible to bridge directly into semester five (year 3) of the eight semester (4 year) Bachelor of Building Science (BBS) Degree program: Architectural Technology, Ontario College Advanced Diploma with an overall GPA of 2.7 (70%) minimum and 560 hours of related work experience; or Civil Engineering Technology, Ontario College Advanced Diploma with an overall GPA of 2.7 (70%) minimum and 560 hours of related work experience.

Please note that applicants who have not completed a required College Diploma or Advanced Diploma may still apply for Advanced Standing and will be assessed on a case-by-case basis to determine the extent of course credit transfer and requirements for degree completion.

DEGREE ELECTIVE INFORMATION:
Students may choose from a variety of breadth courses. Courses from a range of disciplines are offered within the humanities, social sciences, sciences, global cultures and mathematics. Elective offerings vary from semester to semester.

CO-OP INFORMATION:
Cooperative education (Co-op) allows students to integrate their classroom learning with a real-world experience though paid work terms. Two academic terms prior to the cooperative education work term, students are required to actively participate in and successfully complete the self-directed co-op online readiness activities and in-person workshops.

Students must actively conduct a guided, self-directed job search and are responsible for securing approved program-related paid co-op employment. Students compete for co-op positions alongside students from Algonquin and other Canadian and international colleges and universities. Algonquin College’s Co-op Department provides assistance in developing co-op job opportunities and facilitates the overall process, but does not guarantee that a student will obtain employment in a co-op work term. Co-op students may be required to re-locate to take part in the co-op employment opportunities available in their industry and must cover all associated expenses; e.g., travel, work permits, visa applications, accommodation and all other incurred expenses.

Co-op work terms are typically 14 weeks in duration and are completed during a term when
students are not taking courses.

International students enrolled in a co-op program are required by Immigration, Refugees and Citizenship Canada (IRCC) to have a valid co-op work permit prior to commencing their work term. Without this document, International students are not legally eligible to engage in work in Canada that is a mandatory part of an academic program.

For more information, please visit https://www.algonquincollege.com/coop .

Successful completion of all courses, including the mandatory cooperative education (Co-op) Work Term(s) is a requirement for graduation.

For more information, please visit www.algonquincollege.com for program updates as they become available or contact Program Coordinator Steve Vardy, at 613-727-4723 ext. 5042 or mailto:vardys@algonquincollege.com .

Course Descriptions

**BIO2200 Botany**

Biologists with an interest in plant life may choose to specialize in botany. Beginning with the organic features of life, focusing on plants, students investigate the diversity of plant life and the basis for distinction amongst various species. With a deeper knowledge of plant structures and variability, students consider the impact of plants in the modern world, including human interactions such as food production, building materials and medicine.

Prerequisite(s): none
Corerequisite(s): none

**BSC1100 Introduction to Building Science**

Students explore buildings and the inter-connectedness of the constituent features and systems that make up a building. In addition to the scientific principles, students learn about the methodologies and approaches, such as LEED, used in this field of study while they broaden their use of disciplinary concepts and vocabulary. The theoretical and methodological framework developed in this course carries through the program striving for building performance optimization by promoting energy efficiency, structural durability, low environmental impact and a healthy living environment.

Prerequisite(s): none
Corerequisite(s): none

**BSC2100 Building Frame and Structural Studies**

Building frames and structures endure a variety of different strains and stresses over the lifespan of a building. Additional expected and unexpected environmental factors can also erode stability over time. Many of these strains and stresses interact with building materials in different ways, and in this course, students delve into the theoretical and mathematical principles that enable successful structural and framing design. Using case studies, scenarios and lab activities involving living lab tools, students evaluate successful and unsuccessful examples of building frames and structures.

Prerequisite(s): SCI1200
Corerequisite(s): none

**BSC2200 Building Systems**

Through readings, discussion, and primary research using living lab tools, students explore the electrical, plumbing and safety systems that add comfort and control to buildings of all types. Beyond tracing the historical development of these specialized fields, students develop an understanding of the role of skilled trades in the implementation and maintenance of these systems. Special attention is paid to both building code requirements, and interpretation of design drawings for these fields.

Prerequisite(s): ELE1200 and ENG1100
BSC2300 Applied Numerical Methods

Students review a variety of building science applications and problems using numerical methods, mathematical knowledge and physics principles to describe, model, forecast and analyze performance. The objective is to use mathematical tools and knowledge acquired in previous courses to learn how to approach and solve building science situations. Students examine subjects, such as mathematical modeling and engineering problem solving, sensitivity analysis, optimization, numerical heat transfer and computational fluid dynamics in building science applications.

Prerequisite(s): MAT8202
Corerequisite(s): none

BSC3100 Renewable Energy

The energy demands of new and existing buildings are an expense that many building owners and managers have accepted as a requirement, but emerging sources of renewable energy are presenting new options. Students work collaboratively to broaden their knowledge of renewable energy sources available for residential and commercial applications and conduct some tests with living lab tools. Beyond the question of generation and storage of this energy, students outline and investigate the benefits and drawbacks that currently exist with respect to integration of these sources with contemporary building systems.

Prerequisite(s): ELE1200
Corerequisite(s): none

BSC3200 Alternative Energy

Students extend their knowledge of energy sources through a consideration of non-fossil fuel options that are currently available or being researched for development. Beyond questions of generation, storage, and integration with contemporary building systems, students analyze the societal response and economic impact of alternative sources of energy that place a greater emphasis on reducing carbon emissions.

Prerequisite(s): BSC3100
Corerequisite(s): none

BSC3300 Energy Conservation and Auditing

In buildings of all sizes for all types of applications, essential components in the establishment and preservation of environmental comfort also play a role in a building's energy utilization. Mindful of code and LEED certification, students, with the support of living lab tools, further develop a picture of the built environment as a holistic system of integrated parts. Students use techniques to assess and improve opportunities to use energy efficiently and reduce energy consumption, while maintaining interior human comfort. Categorizing energy utilization through energy audits, students identify worthwhile energy-saving strategies.

Prerequisite(s): BSC2200
Corerequisite(s): none

BSC4100 Applied Energy Management

Using existing and emerging research available from a variety of related disciplines, students examine new and accredited hardware, and software that enable a variety of approaches for the management of energy and the control of the interior environment. Some topics root the theories and concepts in the site planning stages, while others work from a retrofit or renovation perspective.

Prerequisite(s): BSC2200 and BSC3300
Corerequisite(s): none

BSC4200 Professional Portfolio Development
Using a guided workshop format, students review their experience and education to date and look ahead to the requirements for employment. The preparation of professional job search documents and a formal or informal portfolio assists students in the identification of personal and professional strengths. Additional discussions around workplace ethics and opportunities for membership in professional associations rounds out this preparation for graduation and employment.

Prerequisite(s): none
Corerequisite(s): none

**BSC4300 Building Science Research Project I**

Working individually or in small teams, students engage in a research project that contributes to the body of knowledge in applied building science. Students focus on the choice of topic, the design of the project, the development of the project proposal, and preliminary research and testing.

Prerequisite(s): none
Corerequisite(s): none

**BSC4350 Building Science Research Project II**

Students complete the research project that was started in the previous semester. The research project is presented to peers and faculty in the form of both a written report and a presentation. Prior to the delivery of these submissions, students ensure that the necessary level of research and testing has been completed and documented.

Prerequisite(s): BSC4300
Corerequisite(s): none

**BSC4400 Seminar in Sustainable Solutions**

In this collaborative learning experience, students research and hypothesize about the direction sustainable solutions may take in the years ahead. Reaching back through the many courses in the program, students look for avenues to integrate sustainability in the context of construction methods and materials, in structural components, the building envelope, building systems and building operations. Students also strive to place any proposals in their historical context in order to consider the broadest application for their recommendations. In addition, students survey contemporary and new concepts, practices and strategies that promote the application of sustainable solutions by enhancing efficiencies and decreasing the demand for resources.

Prerequisite(s): none
Corerequisite(s): none

**CAD1200 Computer Applications for Design and Reporting II**

Drawing on prior knowledge, students continue their work with computer-aided design tools. Through a combination of instructor-led and self-guided exercises, students develop a deeper familiarity with the capabilities of this design software, and the role it plays within the context of construction projects. Students also begin to work with software that facilitates the consolidation and reporting of information related to building operations.

Prerequisite(s): DAT1100
Corerequisite(s): none

**CAD3200 Building Information Modeling**

In construction and the building lifecycle process, alignment and improvement of both qualitative and quantitative metrics is guaranteed in building information modelling. Students apply the theoretical and mathematical principles behind software tools designed to increase productivity in building design and construction. Students develop a three-dimensional model that allows them to add aspects of time and cost to a construction project. Information related to the properties of systems and materials are applied to enable the assessment of various aspects of building performance under particular scenarios. In addition, students develop a process that produces a
building information model. This model can then be used for analysis during design, and construction in order to forecast interior building conditions, comfort, energy use, illumination or structural behaviour.

Prerequisite(s): CAD1200
Corerequisite(s): none

**CAD4100 Energy Modelling and Simulation**

Students explore a number of advanced software tools that use powerful analytical mechanisms to model the whole building during the design of new construction or during major renovations. With the emphasis on energy modeling and simulation students identify the cross-system impacts of individual decisions on building envelope, lighting, electrical power, ventilation and mechanical heating and cooling system performance.

Prerequisite(s): CAD3200 and ENG3100
Corerequisite(s): none

**CON1100 Space and Place: Site Development and Built Environments**

A wide array of variables play an important role in the on-going success of buildings after the construction phase has been completed. Students begin to develop the critical eye that can visualize and identify a range of functional attributes based on preliminary designs. An overview of theoretical principles related to site planning, including code requirements and legal questions, draws attention to a number of issues that affect the overall character and functionality of a building. Students also spend time observing the way people use and interact with buildings.

Prerequisite(s): none
Corerequisite(s): none

**CON2200 Business Development for the Construction Industry**

As a substantial economic sector, the construction industry reaches many facets of today's society. On the strength of a broad industry overview, students explore three specific business skills at play in the construction industry. With its focus on responding to clients and their requirements, students work with the concepts and principles of client relationship management from both an organizational and consulting perspective. To this service focus is added a financial edge in the form of estimating. Through guided exercises, students become familiar with valuable estimating skills that can make the difference between profit and debt. Finally, students balance these two seemingly contradictory elements with value engineering concepts that respond to client needs in a financially viable fashion.

Prerequisite(s): none
Corerequisite(s): none

**CON3200 Seminar in Constructability**

Using the knowledge and skills acquired to date in the program, students solve problems that arise when construction practicality meets aesthetic design. Students contribute to this seminar through the presentation of solutions to case studies from a variety of contexts. Through this contribution, students both lead a case team and participate as a team member for other cases.

Prerequisite(s): BSC2100
Corerequisite(s): none

**CON4200 Construction Methods for Renovation and Rehabilitation**

Building from scratch is not always the most feasible solution in today's marketplace, and so owners turn to renovation and rehabilitation as an alternative. Through the application of existing knowledge to cases and scenarios, students examine a variety of procedures, pitfalls and concerns that emerge in these situations. Emphasis is placed not only on code requirements and environmental legislations, but also on accurate assessment of the existing systems, and structures in order to minimize the need to overhaul entire components without sacrificing the building's
functionality.

Prerequisite(s): none  
Corerequisite(s): none

**DAT1100 Computer Applications for Design and Reporting I**

Office productivity suites and computer-aided design applications are an important part of the design and reporting that takes place in the construction industry. To be efficient and effective contributors in the workplace, employees must be both quick and accurate with their work. Students are provided hands-on opportunities to develop and extend their knowledge and skills with current office productivity tools, such as word processors and spreadsheet applications, and begin to explore available tools for computer-aided design.

Prerequisite(s): none  
Corerequisite(s): none

**DSN1200 Building Design Processes**

Through a variety of team-based simulations, students engage in aspects of the building design process in order to develop both a feel for the stages in the design process, and also an awareness of the time and work that culminates in a set of design plans. Students learn basics and history of design to gradually come to the idea of the integrated design process (IDP). Discussions and presentations place code requirements and principles of different energy and environmental assessment tools (such as LEED certification) in their historical context. Students use these tools to evaluate case studies of existing buildings.

Prerequisite(s): none  
Corerequisite(s): none

**DSN2200 Sustainable Design**

Sustainable design is the conception and insight of an environmentally responsive expression as a part of the evolving matrix of nature. The integration of elements that contribute to LEED certification is an essential part of sustainable design. Students connect their knowledge and skills in design and building systems to the requirements of the LEED pointing system. Working in teams, and using complete and partially complete plans, students analyze designs and propose opportunities to increase the level of LEED certification for a building. Within this context, students also explore passive solar design and low energy design.

Prerequisite(s): none  
Corerequisite(s): none

**ELE1200 Electricity and Power Generation Fundamentals**

Students acquire some fundamental knowledge of the way in which electricity is generated. Discussions and exercises focus on addressing questions of energy efficiency and energy savings. Students become proficient with a number of theoretical calculations for current and voltage. Practical labs and demonstrations supplement the theoretical knowledge.

Prerequisite(s): none  
Corerequisite(s): none

**ENG1100 Thermodynamics**

Engineering-related disciplines, such as building science, draw heavily on a variety of sciences in order to identify, describe and solve problems presented by real-world situations. In order to engage in this approach to problem solving, students begin an exploration of theoretical and practical applications of a number of laws of science. Through exercises, and research projects, students visualize solutions to problems that are supported both scientifically and mathematically.

Prerequisite(s): none  
Corerequisite(s): none
ENG2100 Geotechnical Engineering

Accurate assessments of the sub-grade geological materials found on a given site are a vital part of the decision-making process related to the construction of foundations and other support mechanisms for buildings. Through a variety of activities, students investigate the ways in which scientific principles of physics interact with environmental principles to create risks that must be overcome in order for buildings to be safe.

Prerequisite(s): SCI1200
Corerequisite(s): none

ENG3100 Heat Transfer

Students further develop their problem-solving abilities through a continued exploration of the theoretical and practical applications of more complex laws of science. Assignments and discussions focus on the principles involving higher level mathematics to resolve problems that are more directly related to applications in building science, such as heat transfer, and energy systems. Students also begin an examination of the role of computer-based models and simulations.

Prerequisite(s): ENG1100
Corerequisite(s): none

ENL1100 Communications and Academic Writing

Effective communication is an integral component of success in the workplace and in lifelong learning. Students review communication theory and its connection to expository writing. Frequent writing exercises encourage the development of content that is coherent, well organized and correct. Students consider and use strategies to generate ideas, to collect and organize information, to acknowledge sources, to identify and develop a thesis and to adapt format, style and tone for different purposes and audiences.

Prerequisite(s): none
Corerequisite(s): none

ENL4100 Creative Writing

Whether for personal or public consumption, many people enjoy writing short fiction to express their creative energy while improving upon their overall writing abilities. Working with professional short stories as models, students examine the stylistic components that contribute to the excitement, atmosphere, and overall readability of short fiction. Students share their work and provide formal feedback on the work of others.

Prerequisite(s): ENL1100
Corerequisite(s): none

ENL4200 New Worlds and Alternative Realities: Speculative Fiction

Speculative fiction gathers together all those works of fiction in which new worlds or alternative realities are envisioned. Within this category of prose, students have the opportunity to explore the various sub-genres that present readers with new ways of thinking about some of the issues that face society. Students also develop skills in critical analysis using a variety of approaches and methodologies from literary studies.

Prerequisite(s): none
Corerequisite(s): none

ENL8810 Technical Communications

Students develop an appreciation of both the applications and the implications of technical communication. Through a combination of written and oral assignments, the practical
requirements of technical communication, along with some of its theoretical foundations, are investigated. As part of these investigations, students examine, discuss and prepare the components of a formal technical report.

Prerequisite(s): none
Corerequisite(s): none

**GEO2300 Principles of Urban Planning**

Increasingly cities and communities are feeling the pressure of expansion, and people from all walks of life feel disconnected from the processes, procedures, and decisions that are affecting everyday life. Students consider urban transformation with a focus on practicing sustainability by exploring innovations in land use, transportation, resource planning and economic development, resulting in employment opportunities, as well as healthy and vibrant cities. Students use local and regional activities as a starting point for developing a knowledge base for future social and community involvement. Research projects and assignments encourage students to identify the gaps between theoretical approaches to urban planning and the practical applications as evidenced in their local surroundings.

Prerequisite(s): none
Corerequisite(s): none

**GEP1001 Cooperative Education Readiness**

Students are guided through a series of activities which prepares them for their co-op job search term. Through a detailed orientation students learn the cooperative education program policies and procedures related to searching and securing a work term opportunity. Students identify their strengths and transferable skills and participate in workshop style sessions that focus on cover letter and resume development, interview techniques and job search strategies. Students learn how to navigate HireAC where employers post cooperative education job opportunities. Students reflect on workplace success, ethics and responsibilities.

Prerequisite(s): none
Corerequisite(s): none

**MAT6443 Calculus I**

Differential calculus is the study of the definition, properties and applications of the derivative of a function. Students study limits of functions. They learn the definition and interpretation of the derivative as a rate of change. Students use differentiation rules to find derivatives of algebraic and transcendental functions. They also apply implicit and logarithmic differentiation to find derivatives. Students study a variety of applications of derivatives such as finding a tangent to a curve and curve sketching. They also solve rates of change and related rates problems.

Prerequisite(s): none
Corerequisite(s): none

**MAT8202 Calculus II**

Integral calculus is the study of the definitions, properties and applications of two related concepts, the indefinite integral and the definite integral. Students calculate both indefinite and definite integrals using a variety of integration techniques, such as integration by substitution, by parts, by partial fractions and by trigonometric substitution. Students study a variety of applications of integration, such as area and volume problems. Students also study power series and their convergence, in addition to finding and computing with Maclaurin series.

Prerequisite(s): MAT6443
Corerequisite(s): none

**MAT8204 Differential Equations**

Physical situations such as beam deflection, harmonic motion, circuit theory or Newton’s laws require solving first or second-order ordinary differential equations. Students learn to solve first-
order differential equations that are Separable Equations, Linear Equations, Equations with Integrating Factors, Exact Equations and Homogenous Equations. Both homogeneous and non-homogeneous second and higher-order differential equations are solved using the method of undetermined coefficients, Laplace Transforms and by variation of parameters. Fourier series are studied and used to solve differential equations.

Prerequisite(s): MAT8202
Corerequisite(s): none

MAT8205 Statistics and Probability

Students review basic statistics operations including probability, random sampling, variability, and the binomial, normal and Poisson’s distributions. Students apply these statistical tools in hypothesis testing and in performing regressions and analysis. Students also apply these tools to statistical process control (SPC), as well as address tolerance and accuracy issues particularly as related to manufacturing and design. Examples are drawn not only from the physical and social sciences but also from business.

Prerequisite(s): MAT8202
Corerequisite(s): none

MGT3100 Introduction to Construction Project Management

It might reasonably be said that the only constant in a construction project is the variables. Students focus their attention on the dynamic features of construction projects that make them both challenging and unique. From equipment to materials to environmental conditions to human resources, students explore the project management role as a means of appreciating the contribution they can make to a project.

Prerequisite(s): none
Corerequisite(s): none

MGT4200 Scenarios in Team Leadership

With the prevalence of team and project-based organizational models in the construction industry, skills in team participation and leadership are integral for success. Students benefit from interactive activities combining seminar discussions with simulated and real scenarios to build leadership skills and experience the challenges that can arise in high-stress, team-based work environments.

Prerequisite(s): MGT3100
Corerequisite(s): none

PHI1000 Logic and Critical Thinking

Logic and critical-thinking skills play an important role in both daily life and ongoing academic studies. As foundational skills, they support both the development and assessment of ideas, concepts and courses of action that are presented on a daily basis. Approaching the subject from both a practical and theoretical perspective, students hone their skills in analysis, argumentation, reasoning and persuasion. A range of topics and thinkers provide material with which students can exercise and apply their skills.

Prerequisite(s): none
Corerequisite(s): none

PHI4000 Philosophy and Popular Culture

Many facets of today’s popular culture engage, directly or indirectly, with the concerns of a variety of philosophical traditions. Drawing on a number of examples, students explore both the way popular culture permeates and spreads through society and the way it interprets and presents philosophical questions. Students develop skills and techniques for assessing the soundness and validity of thought experiments.

Prerequisite(s): PHI1000
**PHI4002 The Philosophy of Drugs**

 Drugs are everywhere: professionals prescribe them to us to make us “better”; we take them recreationally; we give them to our children, pets and other loved ones; we buy them on the streets and in grocery stores. What are "drugs"? Why are some drugs legal and others not? How do drugs get to market? What ethical issues are relevant in a global drug industry? Are current intellectual property regimes appropriate if the goal of drug research is to promote benefits to society? Students critically examine these, and other, questions through the lens of historical and contemporary ethical, philosophical and legal theories and arguments. Students engage in various peer-oriented learning activities throughout the course.

Prerequisite(s): none

**Corerequisite(s): none**

**PHI4003 The Philosophy of Love and Sex**

 Love and sex are central to the human condition, and have been topics of academic inquiry and controversy throughout history. Various practices surrounding love and sex are celebrated in Western culture, such as monogamy and marriage, while other practices, such as polygamy and pedophilia, are condemned. Why is this? Students critically explore these and other issues surrounding love and sex using examples from popular music, movies and literature, framing those issues with the help of historical and contemporary philosophical theories and arguments. Students engage in various peer-oriented learning activities throughout the course.

Prerequisite(s): none

**Corerequisite(s): none**

**PHI4004 Technology, Society and the Environment**

 Environmental issues have come to occupy a central place in the marketplace, politics, policy, and society at large. Owing largely to the many environmental consequences that have accompanied industrialization, we humans have been forced to rethink the complex relationship between technology, society and the environment. Students investigate philosophical concepts and theories surrounding technology, society and the environment including: the “naturalness” of technology, sustainability and animal rights. Students critically examine course material by focusing on questions such as: What is nature, and what role do/should humans occupy in it? What do we owe non-human organisms? What do we owe future generations? Students engage in various peer-oriented learning activities throughout the course.

Prerequisite(s): none

**Corerequisite(s): none**

**PHI4100 Survival in the Information Age: Risk and the Media**

 On an almost daily basis, the media, through its various outlets - television, radio, web sites, RSS, and podcasts - reports on issues that address our wellbeing. Through discussions, readings, and assignments, students enhance their ability to interpret and question information presented by the media by better understanding the inherent risks. Issues like alternative medicine (i.e. vaccinations) and socio-legal issues (i.e. bullying, hacking, surveillance, privacy) provide grounds for students to use principles from the social science as a means to think critically about real and perceived risks in daily life.

Prerequisite(s): PHI1000

**Corerequisite(s): none**

**PHY4000 Black Holes, Big Bangs and the Cosmos**

 The dynamic and exciting field of Cosmology outlines our current understanding of the Universe from its start, at the so-called Big Bang, through the ensuing 13 plus billion years to the present and beyond. Students learn how to discuss our present understanding of the three phases of the Universe as well as its five part make up, with matter making up only 4% of the whole. Students
explain our knowledge of the various phases of evolution of the Cosmos and also the latest theories and experiments that are trying to address our uncertainties. Throughout the course, students evaluate and debate many of today's ideas and concepts revolving around cosmology.

Prerequisite(s): none
Corerequisite(s): none

**SCI1200 Materials Science**

Students gain an up-close, hands-on sense of the physical, chemical, and aesthetic characteristics of materials used in the construction industry. Experiments in a lab setting and small research assignments ensure the application of the scientific method and the documentation of observations and results. Introduction to both the safety equipment and the procedures for the lab are also part of this course.

Prerequisite(s): none
Corerequisite(s): none

**SOC2000 Introduction to Sociology**

When working with individuals and groups it is important to understand both the background and influences present. Students develop a familiarity with sociological theories and methodological approaches used to study individual and group behaviours. Students also examine variables that include culture, social class, race, and gender and how these variables may impact work with diverse individuals and groups.

Prerequisite(s): ENL1100
Corerequisite(s): none

**SOC4000 Criminology**

The interdisciplinary study of social science examining the individual and social aspects of crime is known as criminology. Students work through an introduction to the social science perspective on crime. Presentations, discussions, and assignments allow students to investigate the various theoretical positions related to crime and criminal behaviour. Working forward from the types and definitions of crime, students trace some of the links between government policy and the impacts of these policies on both society and the individual.

Prerequisite(s): SOC2000
Corerequisite(s): none

**SOC4001 Global Perspectives**

Sociology, through its exploration of the organization of society and the connections between people and their surroundings, provides new ways of looking at the world. Using fundamental knowledge in the field of sociology, students analyze globalization and its impact on Canadian society. Students take opposing views to debate the opportunities and challenges that come with globalization.

Prerequisite(s): SOC2000
Corerequisite(s): none

**WKT2500 Work Term I**

Immediately following semester four, the first co-op placement provides students with experiential opportunities within the construction industry and related industries. The first work term centres on attaining entry-level positions that immerse students in a variety of activities allowing them to apply principles and concepts developed over the first two years of study. Students returning from Co-op Placement I bring additional practical considerations to their third year of study.

Prerequisite(s): none
Corerequisite(s): none
WKT3500 Work Term II

Immediately following academic term six, the second co-op placement provides students with experiential opportunities within the construction industry and related industries. The second work term centres on applying knowledge and skills developed since the last placement and accepting increasing responsibilities. Students returning from Co-op Placement II draw on their experience for a number of their final year seminars.

Prerequisite(s): none
Corerequisite(s): none