Area of Interest: Engineering and Architecture

Bachelor of Building Science (Entry Level 05) (Honours) (Co-op)

Honours Degree
4 Years
Ottawa Campus

Academic Year: 2020/2021
Program Code: 1512B03FWO

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 of building environments. It covers all facets of building design, construction, human comfort and sustainability. It is Canada’s only Bachelor of Building Science program.

If you have an Advanced Diploma from Architectural Technology or Civil Engineering Technology you may be eligible to enter the third year of the program. See Application/Admission Information for details.

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 spend approximately one third of your time working in 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 a mandatory cooperative education (co-op) semester.

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, and research and leadership skills.

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 that are 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

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<tr>
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<td>ENG1100</td>
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<td>MAT8205</td>
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<td>CON4200</td>
<td>Construction Methods for Renovation and Rehabilitation</td>
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<tr>
<td>MGT4200</td>
<td>Scenarios in Team Leadership</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 and can be purchased in the campus store. See [https://www.algonquincollege.com/coursematerials/](https://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**

**Program Eligibility**

- Graduates from one of the following Ontario College Diplomas with the noted Grade Point Averages are eligible to bridge directly into level five (year 3) of the eight level (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*.

- A bridging course is required and will be added to the students’ level 05 course load. 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 3 course load).

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

**Program Eligibility**

- Graduates from one of the following Ontario College 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

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**Application Information**

**BACHELOR OF BUILDING SCIENCE (ENTRY LEVEL 05) (HONOURS) (CO-OP)**

Program Code 1512B03FWO

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

Applications are available online at [http://www.ontariocolleges.ca/](http://www.ontariocolleges.ca/). A $95 fee applies.

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 applying from out-of-country can obtain the International Student Application Form at [https://algonquincollege.force.com/myACint/](https://algonquincollege.force.com/myACint/) or by contacting the Registrar`s Office.

For further information on the admissions process, contact:

Registrar`s Office
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) will be 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 five (year 3) 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 3 course load.) * ENG1100 - Engineering Principles is required and will be added to the student’s Level 05 course load.

Please note that applicants who have not completed the required Ontario 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 through 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 the 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

**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
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

### 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

### 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

### 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

### 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
Bachelor of Building Science (Entry Level 05) (Honours) (Co-op)

simulations.
Prerequisite(s): ENG1100
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

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

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

**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
Corerequisite(s): none

**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
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
Corequisite(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
Corequisite(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
Corequisite(s): none