

Area of Interest: Construction and Skilled Trades

## Bachelor of Science (Building Science) (Co-op) (Honours) – Pathway for Architectural Technician

Honours Degree

Program Code: 1512C03FWO

4 Years

Ottawa Campus

### Our Program

This four-year Bachelor of Science (Building Science) (Honours) degree prepares you to develop the skills and knowledge necessary to analyze and problem solve in optimizing the performance of buildings by bridging all facets of building design, construction, human comfort and sustainability.

Eligible graduates of the Architectural Technician Ontario College Diploma program can apply to this pathway program and receive credit for 17 courses in the degree, reducing the time to degree completion to 3 years.

Opportunities for applied and hands-on experiences with building materials, components and systems are woven throughout the program of study. The program integrates theoretical and applied learning environments to provide opportunities for you to experience current and emerging technologies that support both the construction and operation of buildings.

This program responds to a critical need to prepare professionals with a better understanding of building physics, which is the core of the program. Throughout the program, you will develop the scientific mindset required to engage in scientific inquiry, reason in a scientific context and provide evidence-based approaches and solutions. You will also hone the skills and abilities needed to optimize buildings working as a system and address the fact that buildings are becoming ever-increasingly more complex. This is driven by the continuously growing demand for increased energy efficiency, comfort, structural durability and healthy environments.

You will develop abilities to recognize, forecast and document both successful and poor building performance as well as analytical skills to evaluate the impact of each component in the system and identify potential problems before they become hazards, or potential opportunities for improved performance.

Given that the complexity of working in a multidisciplinary industry requires group success, you will collaboratively conceive, develop and implement solutions as a team using holistic approaches. You will emerge as generalists able to handle these complexities through integrated construction practices. Algonquin Centre for Construction Excellence (ACCE) offers access to an integrated learning and applied research environment. ACCE provides an industry hub to train, inspire and collaborate with construction industry partners.

Interactive and dynamic courses encourage the development of personal and interpersonal skills that position you for success in your future employment.

Students also gain real-world experience through a paid co-operative education (co-op) work term (s) (see Additional Information for more details). Please note that places in the co-op work term(s) are subject to availability and academic eligibility. Please note admission to a co-op program does not guarantee a co-op placement.

Industry trends and market analyses are indicative of employment opportunities for graduates. With the knowledge learned in this program, you may be able to find work as building scientists, architectural or construction project managers, energy consultants or building inspectors. You may also find employment as a researcher, junior analyst, entrepreneur or as technical staff with engineering firms or government agencies.

### SUCCESS FACTORS

This program is well-suited for students who:

- Appreciate the role of mathematics and applied science in the development of engineering solutions.
- Like to use drawings and spatial reasoning to visualize possibilities.
- Are inquisitive about the reasoning behind the choices and decisions made during building construction materials.

## 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 scientific and 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, equipment, 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

Level: 03	Courses	Hours
BSC1200	Professional Practice	14.0
BSC1400	Building Science II	42.0
ENG1100	Thermodynamics	42.0

GEP1001	Cooperative Education and Job Readiness	18.0
MAT6443	Calculus I	56.0
SCI1100	Physics I	21.0
SCI2300	Materials Science II	28.0
<b>Level: 04</b>	<b>Courses</b>	<b>Hours</b>
BSC2400	Cost Estimating	28.0
ENG3100	Heat Transfer	42.0
MAT8202	Calculus II	56.0
SCI1200	Materials Science I	42.0
SCI2201	Physics II	21.0
<b>Elective: choose 1 Courses</b>		<b>Hours</b>
BIO2200	Botany	56.0
ECO2000	Environmental Economics	42.0
ENL2025	Interpersonal Communication	42.0
FLS3101	French as a Second Language - Beginner 1	42.0
FLS3102	French as a Second Language - Beginner 2	42.0
GEO2300	Principles of Urban Planning	56.0
LAN3101	Spanish - Beginner 1	42.0
LAN3102	Spanish - Beginner 2	42.0
LAW2014	Law	42.0
PHI2002	Ethical Decision Making	42.0
PSI2000	Navigating Canada's Political Landscape	56.0
PSY2100	Introductory Psychology	42.0
SCI2000	Environmental Science	42.0
SOC2000	Introduction to Sociology	56.0
SOC2001	Anti-Racism: Theory and Practice	42.0
<b>Co-op: 01</b>	<b>Courses</b>	<b>Hours</b>
WKT2500	Work Term I	
<b>Level: 05</b>	<b>Courses</b>	<b>Hours</b>
BSC2210	Building Systems I	28.0
DSN3100	Building Design Processes II	21.0
ENG2100	Geotechnical Engineering	42.0

MAT8203	Linear Algebra	42.0
<b>Elective: choose 2 Courses</b>		<b>Hours</b>
ENL4100	Creative Writing	42.0
ENL4200	New Worlds and Alternative Realities: Speculative Fiction	42.0
PHI4000	Philosophy and Popular Culture	42.0
PHI4002	The Philosophy of Drugs	42.0
PHI4003	The Philosophy of Love and Sex	42.0
PHI4004	Technology, Society and the Environment	42.0
PHI4100	Survival in the Information Age: Risk and the Media	42.0
PHY4000	Black Holes, Big Bangs and the Cosmos	42.0
SOC4000	Criminology	42.0
SOC4001	Global Perspectives	42.0
<b>Level: 06</b>	<b>Courses</b>	<b>Hours</b>
BSC3420	Building Systems II	42.0
BSC4000	Building Envelope II	42.0
CAD3200	Building Information Modeling	42.0
ENL8810	Technical Communications	42.0
MAT8204	Differential Equations	42.0
PHI2000	Introduction to Research	42.0
<b>Co-op: 02</b>	<b>Courses</b>	<b>Hours</b>
WKT3500	Work Term II	
<b>Level: 07</b>	<b>Courses</b>	<b>Hours</b>
BSC2300	Applied Numerical Methods	42.0
BSC3100	Renewable Energy	42.0
BSC3300	Energy Conservation and Auditing	42.0
BSC4300	Building Science Research Project I	56.0
CAD4100	Energy Modelling and Simulation	42.0
MAT8205	Statistics and Probability	42.0
<b>Level: 08</b>	<b>Courses</b>	<b>Hours</b>
BSC2100	Building Frame and Structural Studies	56.0
BSC3200	Alternative Energy	42.0
BSC4210	Professional Portfolio Development	7.0

BSC4350	Building Science Research Project II	56.0
ENL4005	Report Writing	14.0
<b>Elective: choose 1 Courses</b>		<b>Hours</b>
BSC4100	Applied Energy Management	42.0
BSC4500	Building Enclosure Commissioning	42.0
ENL4100	Creative Writing	42.0
ENL4200	New Worlds and Alternative Realities: Speculative Fiction	42.0
PHI4000	Philosophy and Popular Culture	42.0
PHI4002	The Philosophy of Drugs	42.0
PHI4003	The Philosophy of Love and Sex	42.0
PHI4004	Technology, Society and the Environment	42.0
PHI4100	Survival in the Information Age: Risk and the Media	42.0
PHY4000	Black Holes, Big Bangs and the Cosmos	42.0
SOC4000	Criminology	42.0
SOC4001	Global Perspectives	42.0

## Fees for the 2023/2024 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>.

Further information on fees can be found by visiting the Registrar's Office website at <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 from the campus store. For more information visit <https://www.algonquincollege.com/coursematerials>.
- 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 2024/2025 Academic Year

### Program Eligibility

- Graduates from the Architectural Technician Ontario College Diploma with Grade Point Averages of 2.7 are eligible to enter this degree program.

## Admission Requirements for 2023/2024 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**

- Graduates from the Architectural Technician Ontario College Diploma with Grade Point Averages of 2.7 are eligible to enter this degree program.

### **Application Information**

#### **BACHELOR OF BUILDING SCIENCE (HONOURS) (CO-OP) Pathway for Construction and Civil Engineering Program Code 1512C03FWO**

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  
Fax: 613-727-7632  
Contact: <https://www.algonquincollege.com/ro>

### **Additional Information**

Algonquin College has been granted consent by the Minister of Colleges and Universities to offer this applied degree for a seven-year term starting February 5, 2021. 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.

#### **CO-OP INFORMATION:**

Co-operative 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 course, readiness activities and 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 College and other Canadian and international colleges and universities. Algonquin College's Co-op Department provides assistance in developing co-op job opportunities and guides 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 relocate 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. For more information on your program's co-op level(s), visit the courses tab on your program's webpage.

International students enrolled in a co-op program are required by Immigration, Refugees and Citizenship Canada (IRCC) to have a valid Co-op/Internship 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 part of an academic program. The Co-op/Internship Work Permit does not authorize international students to work outside the requirements of their academic program.

For more information on co-op programs, the co-op work/study schedule, as well as general and program-specific co-op eligibility criteria, please visit <https://www.algonquincollege.com/coop>.

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

**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 Colleges and Universities (MCU) 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 MCU must have their degrees evaluated by a recognized Canadian public or private institution that specializes in the evaluation of international degree programs. MCU 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 of related Ontario College Diploma or Ontario College Advanced Diploma programs may be eligible for advanced standing into the degree program. Please visit the degree program listing or speak to the Program Coordinator for more information and to confirm eligibility.

**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.

**Contact Information****Program Coordinator(s)**

- Stephen Vardy, <mailto:vardys@algonquincollege.com>, 613-727-4723, ext. 5042

**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

**BSC1200 Professional Practice**

Maintaining relevancy and currency within one's field is essential to a successful career. Students explore job opportunities in the field of building science and resources involved in certification (e.g. BSSO), conferences/events, professional organization (ASHRAE, etc.), research, education, best

practices, individual professionalism, independent practice and consulting. Students start the development of a portfolio gathering work performed throughout the program.

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

### **BSC1400 Building Science II**

Environmental elements greatly influence the operational aspects of any building. Students apply principles of physics to develop strategies to control air leakage and ventilation, moisture, heat gain/losses by solar radiation and rain penetration in buildings. Through the analysis of past and existing buildings, students discuss the major causes of envelope failures as well as examples of high performance buildings.

Prerequisite(s): BSC1100  
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 no successful examples of building frames and structures.

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

### **BSC2210 Building Systems I**

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

### **BSC2300 Applied Numerical Methods**

Students reviews a variety of building science applications and problems using analytical techniques, mathematical knowledge and physics principles to describe, model, forecast and analyze performance. The objective is to use mathematical tools 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

### **BSC2400 Cost Estimating**

The success and failure of projects often rest on the accuracy of estimated costs up front. Students work through the bid process and prepare estimates with varying levels of detail that are both viable and achievable. Topics discussed include survey quantities, quantity take off, labour hours and rates, materials and equipment costs, subcontractor and indirect costs, tender forms, bid, estimate and summary sheets.

Prerequisite(s): none



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): none  
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): BSC3420  
Corerequisite(s):none

### **BSC3420 Building Systems II**

Striking a balance between efficiency and objectives can be challenging in the building science field. Students examine the requirements to implement and manage the ongoing operation and maintenance of building systems and to maximize building efficiency and cost-effectiveness. Through the use of proper charts and equations, students rely on Bernoulli's equation and its extended energy equation form to calculate energy loss in piping and ducting systems. Topics include examination of various components and systems such as heat recovery ventilation and energy recovery ventilation, air distribution, pressure regimes, natural and hybrid ventilation, indoor air quality, illumination, acoustics, fire safety, plumbing systems and waste water. Special attention is paid to both building code requirements, and interpretation of design drawings for these fields. The content of the course also enables the students to understand "Residential Mechanical Ventilation" courses offered by HRAI for certification.

Prerequisite(s): BSC2210  
Corerequisite(s):none

### **BSC4000 Building Envelope II**

Proper design and detailing of roof systems is crucial for the adequate performance of the building envelope. Through case studies and examples, students examine a range of roofing systems from their design through their application and maintenance. To define the scope of repairs, students conduct the required diagnostic approaches, investigate failures and identify possible remedies.

Prerequisite(s): BSC3400  
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): BSC3300  
Corerequisite(s):none

### **BSC4210 Professional Portfolio Development**

In the profession of building science, the ability to construct a portfolio is an important skill. Students collect all the projects for their portfolio throughout the program to present in a professional format.

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): ARC1000  
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

### **BSC4500 Building Enclosure Commissioning**

A critical aspect of building science is quality assurance measured against desired goals, criteria and objectives, and this is best achieved by the Building Enclosure Commissioning (BECx) process. Students gain knowledge through and participate in simulations of the BECx process, which is utilized to validate that the design and performance of materials, components, systems and assemblies achieve the objectives and requirements of a building project owner. Students further develop and refine knowledge and understanding of building enclosure materials, components, systems and assemblies - such as foundations, walls, roofs windows/doors, and skylights - their importance, and how they are assessed, both qualitatively through visual review and quantitatively through laboratory or field testing to meet the relevant performance standards. Students develop a realistic and applied approach to the BECx field. Comprehension of the BECx process provides students with an enhanced knowledge base in how buildings operate that is directly transferable to the work force.

Prerequisite(s): BSC4000  
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): CAD2400  
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

**DSN3100 Building Design Processes II**

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 fundamentals and history of design to gradually understand the idea and practical use of the integrated design process (IDP). Discussions and presentations include various requirements such as code and principles of different energy and environmental assessment tools. These include building and materials assessment tools/ frameworks. Students use such tools to evaluate theoretical or existing buildings in order to understand the impact of the design decisions related to the building and materials life cycles.

Prerequisite(s): DSN2300  
Corerequisite(s):none

**ECO2000 Environmental Economics**

Issues pertaining to the environment have a major financial impact on society and government. Environmental economics examines the way human decisions affect the quality of the environment, how human values and institutions shape our demands for improvements in the quality and about designing effective public policies to bring about these improvements. Students examine problems and solutions relating to environmental policy analysis in the Canadian context.

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

**ENL2025 Interpersonal Communication**

Effectively communicating with others, both professionally and personally, is an art that requires conscious development. Students address the techniques related to interpersonal communication challenges in the diverse workplace. Focus is on communication barriers, verbal and non-verbal communication, listening, team work, and relational dynamics. Through role play, analysis, and case studies, students engage in simulated and authentic interpersonal communication situations.

Prerequisite(s): ENL1100

Corerequisite(s):none

**ENL4005 Report Writing**

Technical report writing remains a crucial skill for professionals within technical disciplines. In this course, students define and describe a problem of significant technical complexity and present a suitable technological/scientific solution within a formal report structure. Drawing upon skills previously acquired, students plan, conduct research for, and create a written report.

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

**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

**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

**FLS3101 French as a Second Language - Beginner 1**

The French language is an asset when communicating in the workplace. Students with no prior knowledge of French acquire basic forms and structures to interact and communicate in a simple way with French speakers. Class instruction and practice, repeated feedback, and exposure to a variety of language samples support students to gain basic oral expression and comprehension using simple phrases that develop vocabulary, pronunciation, and comprehension. Students begin to appreciate cultural and linguistic differences when French is used in the workplace.

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

**FLS3102 French as a Second Language - Beginner 2**

The workplace benefits from having professionals with knowledge of the French language. Students with basic knowledge of French gain more control over forms and structures to interact and communicate in a simple way with French speakers. Class instruction and practice, repeated feedback, and exposure to a variety of language samples provide students with opportunities to enhance their basic oral expression and comprehension using simple phrases that further develop vocabulary, pronunciation, and comprehension. Students deepen their knowledge of cultural and linguistic differences of French in the workplace.

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 and Job Readiness**

Students are guided through a series of activities that prepare them to conduct a professional job search and succeed in the workplace. 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 a web-based resource centre, which is used to post employment and cooperative education job opportunities. Students reflect on workplace success, ethics and responsibilities.

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

### **LAN3101 Spanish - Beginner 1**

The Spanish language is an asset when communicating in the workplace. Students with no prior knowledge of Spanish acquire basic forms and structures to interact and communicate in a simple way with Spanish speakers. Class instruction and practice, repeated feedback, and exposure to a variety of language samples support students to gain basic oral expression and comprehension using simple phrases that develop vocabulary, pronunciation, and comprehension. Students begin to appreciate cultural and linguistic differences when Spanish is used in the workplace.

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

### **LAN3102 Spanish - Beginner 2**

The workplace benefits from having professionals with knowledge of the Spanish language. Students with basic knowledge of Spanish gain more control over forms and structures to interact and communicate in a simple way with Spanish speakers. Class instruction and practice, repeated feedback, and exposure to a variety of language samples provide students with opportunities to enhance their basic oral expression and comprehension using simple phrases that further develop vocabulary, pronunciation, and comprehension. Students deepen their knowledge of cultural and linguistic differences of Spanish in the workplace.

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

### **LAW2014 Law**

The reach of the rule of law extends into our lives on a daily basis. As much as it is present in our lives, very few people are aware of the processes, procedures and theories that guide and underpin the development and maintenance of a functional legal system. With attention to key historical figures and events, students explore the scope, jurisdiction, and key concepts of the sub-disciplines within the field of law. Through an introduction to legal arguments and methodologies, students distinguish between various legal systems and wrestle with the difference between law and justice.

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 and continuity 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, curve sketching, and finding an approximate solution to an equation using Newton's method. 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. They use the Trapezoidal and Simpson's Rules to perform numerical integrations. Students study a variety of applications of integration, such as area, volume and work problems.

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

**MAT8203 Linear Algebra**

Students are provided an introduction to the basic concepts and techniques of linear algebra including systems of linear equations, matrix operations, determinants, vectors in n-space, linear transformations, eigenvalues, and eigen vectors, together with selected applications, such as linear programming, economic models, least squares and population growth.

Prerequisite(s): none  
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

**PHI2000 Introduction to Research**

Academic research requires students to possess a fundamental knowledge of accepted methodologies and practices. An overview of the research process and tools prepares students to engage in scholarly work. Emphasis is on evaluation, selection and documentation of primary and secondary sources, as well as the development of a research project.

Prerequisite(s): ENL1100 and PHI1000  
Corerequisite(s):none

### **PHI2002 Ethical Decision Making**

To avoid potential prosecution, companies and their employees are well-advised to engage in ethical decision-making practices in all business situations. Students examine ethical concepts and principles, compare a variety of ethical decision-making models and utilize these principles and models to make ethically sound decisions in a variety of contexts. Students also design a code of ethics, practice making ethically- based decisions and develop the analytical skills required to recognize, evaluate and resolve ethical dilemmas in the workplace.

Prerequisite(s): PHI1000  
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

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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

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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

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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

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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

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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

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

**PSI2000 Navigating Canada's Political Landscape**

A developed knowledge of government and politics is key to an effective participation in public life. Drawing on current events, students explore the societal, cultural and constitutional context along with the major political parties and institutions that shape the Canadian political landscape. Students develop skills and techniques that allow them to position politicians, parties, and policies, past and present, on the spectrum of political ideology and Canadian political traditions. Working together and individually, students analyze issues from the perspective of various political approaches.

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

**PSY2100 Introductory Psychology**

With its applications to behaviour and personality, psychology extends its reach into many aspects of our personal lives. The broad applications of this social science in both an applied and theoretical context are premised on a number of fundamental principles. Students explore historical breakthroughs that define the current boundaries of the discipline and interact with a number of the foundational concepts that resonate throughout daily life and popular culture. Students develop an introductory knowledge in the various schools of thought within the discipline.

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

**SCI1100 Physics I**

Buildings rely heavily on the integration of nature and properties of matter and energy. Students form a solid foundation in elementary mechanics and general physics including kinematics (one and two dimensional motion, circular motion), Newton's Laws, types of forces such as gravitational force, tension force, friction force and Hooke's law, work, energy, power and thermodynamics.

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

**SCI1200 Materials Science I**

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

**SCI2000 Environmental Science**

Environmental science is an interdisciplinary study of how the earth works, human interaction with the earth and how to address the existing environmental problems. Students explore natural capital and the degradation. Students engage in case studies, critical thinking and analysis of alternatives in exploring solutions and trade-offs in trying to address degradation.

Prerequisite(s): ENL1100 and PHI1000  
Corerequisite(s):none

**SCI2201 Physics II**

Possessing the underpinnings to understand how things work from first principles provides the basis to becoming a successful professional in the field of building science. Students develop a foundation in general and applied physics including topics such as vectors, conditions of equilibrium, force and motion, dynamics of rigid bodies, gravitation, rotation, elasticity, properties of sound, waves and vibrations and acoustics.

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

**SCI2300 Materials Science II**

Selection of building material greatly influences building performance. Students continue their study of the materials used to construct and repair the building envelope. Through the analysis of material's atomic structure, hygrothermal properties and compatibility students compare different materials used in the envelope linings to forecast the performance of assemblies. Considering the physical phenomena that affect materials behavior students examine mechanisms of deterioration.



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

### **SOC2001 Anti-Racism: Theory and Practice**

Anti-racism is the practice of identifying, challenging, and changing the values, structures, and behaviours that perpetuate systemic racism. Students explore concepts of anti-oppressive practice, anti-racist pedagogy, diversity, and inclusion at the personal, societal, and institutional levels. Students develop an understanding of historical and present-day groups and figures that challenge oppressive structures in Canadian society. Through various learning activities and discussion boards, students will develop the necessary knowledge, attitude, and skills to become an authentic ally within society.

Prerequisite(s): none  
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

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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



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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