

## ELECTROMECHANICAL ENGINEERING TECHNOLOGY – BUILDING AUTOMATION PROGRAM (T171)

<b>PROGRAM NAME</b>	Electromechanical Engineering Technology – Building Automation
<b>COURSE CODE</b>	T171
<b>SCHOOL</b>	School of Mechanical and Engineering Technologies
<b>CENTRE</b>	Construction Engineering Technology
<b>LOCATION</b>	Casa Loma Campus
<b>DURATION</b>	3 years (6 semesters)
<b>EXPERIENTIAL LEARNING</b>	Available
<b>STARTING MONTH</b>	September, January
<b>CREDENTIAL</b>	Ontario College Advanced Diploma
<b>YEAR OF STUDY</b>	2019-2020
<b>METHOD OF STUDY</b>	FT
<b>APPLY TO</b>	Ontario Colleges <sup>1</sup>

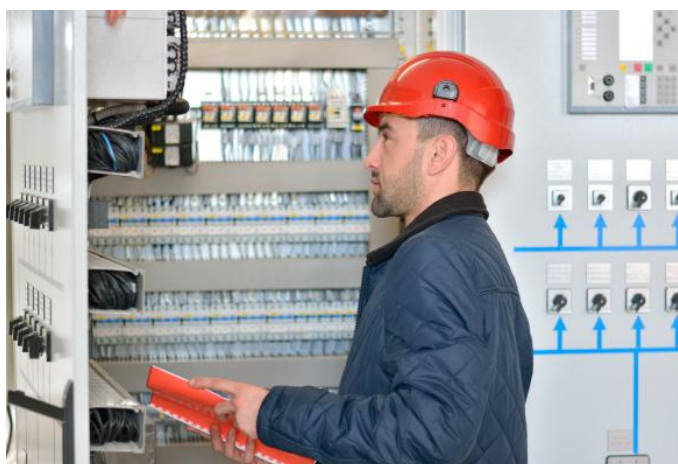
### TUITION

\$4,373.00 \*

### ADDITIONAL COST

\*Amounts listed are the total of tuition, materials, student service and ancillary fees for the first two semesters of programs starting in Fall **2018**. Fees are subject to change for programs starting in Fall 2019 and at later dates.

**International students:** Visit the International Fees and Related Costs<sup>2</sup> page for more information.



Building automation systems don't just control the basics: they regulate airflow, monitor energy use and are integrated with security, lighting and other building systems to deliver comfort, safety and energy efficiency. Today's buildings are increasingly complex, and they differ in use and size, but also in operating hours, comfort levels and environmental conditions. Offices, residences, hotels, schools and administrative buildings all have different requirements. Optimal building services technology is the result of appropriate systems design and integration during planning, construction, commissioning and operation.

This advanced diploma program in Building Automation provides students the technical skills they need for success in the job market. Students learn to:

- Install, program, adjust and maintain building automation systems
- Program and install sensors, actuators and controllers
- Collect data for use in real time or for archiving in a central server
- Work with building software platforms that interconnect different systems

Graduates will have a diverse set of skills and abilities that will also prepare them for "green" careers focused on energy efficiency, renewable energy and the environment. This program provides a skill set that is in high demand in both the construction industry and the controls and automation industry.

### INDUSTRY SKILLS

- Safety practices in the installation and troubleshooting of HVAC/R systems, including applicable codes and standards of the NEC, ASHRAE, OSHA, EPA and other regulatory bodies.
- Basic HVAC/R processes and the function, layout and operation of commercial HVAC/R systems.
- Functions, operating characteristics and applications of the control loops and control modes in digital, analog and pneumatic commercial control systems.
- Blueprints and manufacturer's technical instructions for installing or servicing a sensor, controller, actuator and related relays and power supplies.
- General-purpose software and specific building automation software that monitors and controls HVAC/R and electrical systems.
- Various BAS controls and systems, including DCS, PLC, PAC and SCADA.
- Functions of network devices and protocols, such as a bridge, router, gateway, hub, firewall, twisted pair, Ethernet, TCP/IP, Zigbee, WiFi, BAS/IP and BacNet.
- Emerging green technologies, such as solar, wind and hydronic, and how they can be integrated into building systems and residential applications.

### EXPERIENTIAL LEARNING

Available

## PROGRAM STANDARDS AND LEARNING OUTCOMES

The graduate has reliably demonstrated the ability to:

1. Fabricate and build electrical, electronic, and mechanical components and assemblies in accordance with operating standards, job requirements, and specifications.
2. Analyze, interpret, and produce electrical, electronic, and mechanical drawings and other related technical documents and graphics necessary for electromechanical design in compliance with industry standards.
3. Select and use a variety of troubleshooting techniques and equipment to assess, modify, maintain, and repair electromechanical circuits, equipment, processes, systems, and subsystems.
4. Modify, maintain, and repair electrical, electronic, and mechanical components, equipment, and systems to ensure that they function according to specifications and to optimize production.
5. Design and analyze mechanical components, processes, and systems by applying engineering principles and practices.
6. Design, analyze, build, select, commission, integrate, and troubleshoot a variety of industrial motor controls and data acquisition devices and systems, digital circuits, passive AC and DC circuits, active circuits and microprocessor-based systems.
7. Install and troubleshoot computer hardware and programming to support the electromechanical engineering environment.
8. Analyze, program, install, integrate, troubleshoot and diagnose automated systems including robotic systems.
9. Establish and maintain inventory, records, and documentation systems to meet organizational and industry standards and requirements.
10. Select and purchase electromechanical equipment, components, and systems that fulfill job requirements and functional specifications.
11. Specify, coordinate, and apply quality-control and quality-assurance programs and procedures to meet organizational standards and requirements.
12. Work in compliance with relevant industry standards, laws and regulations, codes, policies, and procedures.
13. Develop strategies for ongoing personal and professional development to enhance work performance and to remain current in the field and responsive to emergent technologies and national and international standards.
14. Contribute as an individual and a member of an electromechanical engineering team to the effective completion of tasks and projects.
15. Design and analyze electromechanical systems by interpreting fluid mechanics and the attributes and dynamics of fluid flow used in hydraulic and fluid power systems
16. Contribute to project management through planning, implementation and evaluation of projects, and monitoring of resources, timelines, and expenditures as required.

## REQUIRED COURSES

### SEMESTER 1

Code	Course Name
EMNG1001	Circuit Analysis
EMNG1004	Metrology
MENG1002	Engineering Drawing
MENG1027	Introduction to Machining
GSSC1027	Personal Finance
MATH1160	Mathematics for Engineering Technology 1
COMM1007	College English

### SEMESTER 2

Code	Course Name
EMNG1003	Engineering Mechanics
EMNG1012	Introduction to Mechanical CAD
EMNG1013	Electronic Devices
EMNG1015	Motors & Controls
EMNG1016	Electro-Pneumatics
MATH1171	Mathematics for Engineering Technology 2
GSSC1100	Small Business Plan and Operation

### SEMESTER 3

Code	Course Name
EMNG2001	Introduction to PLC Systems
EMNG2004	Digital Electronics
EMNG2020	Sensors & Instrumentation
EMNG2021	Automation Software Development
MENG2070	Workplace Essentials
GNED	General Education Elective

### SEMESTER 4

Code	Course Name
EMNG2022	Measurement and Final Control Elements
EMNG2024	Internet of Things for Homes and Buildings
EMNG2025	Electrical Techniques
EMNG3003	Network Fundamentals
MENG2046	Sustainable Energy Technologies
MENG3030	Technical Report Writing
GNED	General Education Elective

### SEMESTER 5

Code	Course Name
EMNG2026	Applied Project 1
EMNG3002	Building Science Fundamentals
EMNG3016	Fundamentals of HVAC/R Systems
EMNG3004	Building Networks and Protocols
EMNG3006	Alarm and Video Systems
EMNG3015	Building Control Systems

**SEMESTER 6**

Code	Course Name
EMNG3011	Building Management and Commissioning
EMNG3013	Building Sub-Systems and Integration
EMNG3018	Capstone Project 2
EMNG3019	Building Operations and Management
EMNG3020	Blueprint Reading for Buildings
EMNG3021	Connected Homes

**YOUR CAREER**

Areas in the building automation industry where graduates will be able to work include:

- Electronics companies
- General contractors
- Communication and information systems companies
- Lighting suppliers and contractors
- Mechanical and electronic controller manufacturers
- Facilities management companies
- Automotive companies and suppliers
- Robotics and automation companies
- Residential developers

**ADMISSION REQUIREMENTS**

Applicants are selected on the basis of their academic achievement, including the required courses, and any other selection criteria outlined below.

- Ontario Secondary School Diploma or equivalent\*\*
- Grade 12 English (C or U)
- Grade 11 Math (M or U) or Grade 12 (C or U)

**\*\* MATURE STUDENT STATUS (19 YEARS OF AGE OR OLDER AND NO OSSD)**

Mature Students may take the Admissions Assessment<sup>3</sup> for English and Math, OR may consider upgrading to achieve the credit(s) needed in English<sup>4</sup> and Math<sup>5</sup>.

Please note that George Brown is committed to ensuring that applicants will succeed in their program of choice and meeting the minimum requirements does not guarantee admission to the program. Applicants may be required to have grades higher than the minimum requirements stated.

**COURSE EXEMPTIONS**

College or university credits may qualify you for course exemptions. Please visit [georgebrown.ca/transferguide](http://georgebrown.ca/transferguide) for more information.

**INTERNATIONAL STUDENTS**

Visit the International Admissions<sup>6</sup> page for more information.

**CONTACT US****School of Mechanical Engineering Technologies**

Phone: 416-415-5000, ext. 4365

Email: [engineeringtech@georgebrown.ca](mailto:engineeringtech@georgebrown.ca)

Our office hours are 8 a.m. – 4 p.m., room D305

For more information about George Brown College, you may also call the Contact Centre at 416-415-2000 (TTY 1-877-515-5559) or long distance 1-800-265-2002.

**VISIT OUR CAMPUS**

Do you have questions about this program or your career options? Join us for an on-campus Information Session. You'll have the opportunity to meet our friendly instructors and staff, ask questions and experience what it's like to be in a George Brown College classroom. Sign up for an Information Session<sup>7</sup>.

**LINKS REFERENCE**

<sup>1</sup><https://collegeapply.ontariocolleges.ca/?collegeCode=GBTC&programCode=T171&lang=en>

<sup>2</sup><http://www.georgebrown.ca/international/futurestudents/tuitionfees/>

<sup>3</sup><http://www.georgebrown.ca/assessment/admi-pre/>

<sup>4</sup><http://www.georgebrown.ca/upgrading-credits/english-diploma/>

<sup>5</sup><http://www.georgebrown.ca/upgrading-credits/math-diploma/>

<sup>6</sup><http://www.georgebrown.ca/international/futurestudents/howtoapply/>

<sup>7</sup>[http://www.georgebrown.ca/tours\\_technology/](http://www.georgebrown.ca/tours_technology/)

*George Brown College is continually striving to improve its programs and their delivery. The information contained in this calendar is subject to change without notice. It should not be viewed as a representation, offer or warranty. Students are responsible for verifying George Brown College admission, graduation, and fee requirements as well as any requirements of outside institutions, industry associations, or other bodies that may award additional designations concurrently with, or after completion of, a George Brown College program.*