

# MECHANICAL ENGINEERING TECHNOLOGY – BUILDING SCIENCES (MBT)

## About the Program

Mitigating climate change has become imperative in many industries, including the building sector. This program will prepare you to become an expert in managing environmentally responsible systems for various types of properties. After three years of study, you'll obtain an advanced diploma and be able to examine, implement and manage a building's energy system, both traditional and renewable, with a focus on sustainability and efficiency.

## Computer Requirements

- operating system: Windows 10, 64 bit
- processor: 3.3 GHz (or faster)
- memory: 16 GB (or larger)
- solid-state drive: 128 GB (or larger)
- second display screen (recommended)

## Credential Awarded

Ontario College Advanced Diploma

## Duration

6 Semesters (3 Years)

## Starts

January, September

## Program and Course Delivery

This program is offered in Seneca's hybrid delivery format with some courses available in Seneca's flexible delivery format. Some coursework is online and some must be completed in person. Students will need to come on campus to complete in-person learning requirements. For courses offered in the flexible delivery format, professors use innovative learning spaces and technology to teach students in a classroom or lab and broadcast in real time to students attending remotely. In flexible courses, students have the choice of coming on campus or learning online.

## Skills

Throughout this program you will develop the following skills:

- Energy efficiency principles
- Building systems software
- Emerging renewable energy technologie

## Work Experience

### Optional Work Term

Students meeting all academic requirements may have the opportunity to complete an optional work term(s) in a formal work environment. The

work term(s) is similar in length to an academic semester and typically involves full-time work hours that may be paid or unpaid. In programs with limited work term opportunities, additional academic requirements and a passing grade on a communication assessment may be required for eligibility. Eligibility for participation does not guarantee a work position will be secured. Additional fees are required for those participating in the optional work term stream regardless of success in securing a work position.

Review eligibility requirements for work-integrated learning (<https://www.senecapolytechnic.ca/employers/seneca-works/work-integrated-learning/eligibility.html>)

## Your Career

Graduates of the program can explore the following career options:

- Energy auditor
- Building systems technologist
- Systems asset manager
- Energy technology manager
- Environmentally sustainable building systems manager

## Professional Certification

- Building Environmental Systems (BES) Operator Class I
- BES Operator Class II (upon successful completion of a few choice courses)

And one of the following certificates:

- Pipe Systems Design
- Air System Design
- Hospital Building Systems

## Program of Study

Course Code	Course Name	Weekly Hours
<b>Semester 1</b>		
BES700	Building Systems: Overview	3
BGD117	CAD Fundamentals	4
BGS161	Building a Sustainable Future	3
COM101	Communicating Across Contexts	3
or COM111	Communicating Across Contexts (Enriched)	
EBE161	Intro. to Engineering and the Built Environment	3
MTH147	Mathematics with Foundations	6
<b>Semester 2</b>		
BES221	Applied Heating	4
BES222	Applied Air Conditioning and Refrigeration	4
BES802	Site Management and Building Safety	3
BGL261	Electricity Fundamentals	4
IPS255	Interpersonal Skills in the Engineering Workplace	3
MTH217	Mathematics II	3
WTP100	Work Term Preparation *	1
<b>Work-Integrated Learning Term 1</b>		

MBT441 Mechanical Engineering Technology - Building Sciences, Work Term\* 30

### Semester 3

BES703	Air Handling	3
BES704	Electrical	3
BES706	Water Treatment	3
BGD361	Building Systems CAD	4
BGM361	Codes and Regulations	3
BGP361	Plumbing and Pipe Systems	2
plus: General Education Course (1)		3

### Semester 4

BES705	Controls	3
BES709	Hospital Building Systems	3
BES710	Energy Efficiency - Large Buildings	3
BES910	Energy Auditing - Large Buildings	3
BGB561	Fire Protection Systems and Procedures	3
TEC400	Technical Communications	3
plus: General Education Course (1)		3

### Work-Integrated Learning Term 2

MBT442 Mechanical Engineering Technology - Building Sciences, Work Term II 1

### Semester 5

BGI561	Intelligent and Integrated Buildings	3
BGN461	Energy Technologies	3
BGT561	Thermodynamics	3
EED522	Energy Efficiency Design	4
MTH356	Mathematics - Introductory Calculus and Statistics	4
PMA561	Project Management	3
plus: Professional Options (1)		

### Semester 6

BGC662	Energy Accounting	3
BGI661	Intelligent Building Systems	3
BGN561	Renewable Energy Technologies	3
TPJ621	Capstone Project	4
plus: Professional Options (2)		

## Professional Options

Course Code	Course Name	Weekly Hours
BES803	Strategic Financial Planning - Facilities	3
BGD566	Engineering Design with Solidworks	4
BGD661	Building Information Modeling with Revit (MEP)	4
PPE655	Engineering Ethics and Professional Practice	5

\* Work-Integrated Learning option only

## Program Learning Outcomes

This Seneca program has been validated by the Credential Validation Service as an Ontario College Credential as required by the Ministry of Colleges and Universities.

As a graduate, you will be prepared to reliably demonstrate the ability to:

- Monitor compliance with current legislation, standards, regulations and guidelines.
- Plan, co-ordinate, implement and evaluate quality control and quality assurance procedures to meet organizational standards and requirements.
- Monitor and encourage compliance with current health and safety legislation, as well as organizational practices and procedures.
- Develop and apply sustainability\* best practices in workplaces.
- Use current and emerging technologies\* to implement mechanical engineering projects.
- Analyze and solve complex mechanical problems by applying mathematics and fundamentals of mechanical engineering.
- Prepare, analyze, evaluate and modify mechanical engineering drawings and other related technical documents.
- Design and analyze mechanical components, processes and systems by applying fundamentals of mechanical engineering.
- Design, manufacture and maintain mechanical components according to required specifications.
- Establish and verify the specifications of materials, processes and operations for the design and production of mechanical components.
- Plan, implement and evaluate projects by applying project management principles.
- Develop strategies for ongoing personal and professional development to enhance work performance.
- Apply business principles to design and engineering practices.

## Glossary

- **Emerging Technologies** – Technologies that are not yet standard but that are likely to be adopted in the near term. The expectation is that an emerging technology will come into standard usage when the application of the technology matures.
- **Sustainability** – Sustainability encompasses the ethical ideal that calls for optimizing the long-term carrying capacity and vitality of three interdependent systems — environmental, social and economic. In a manufacturing context, sustainability aims to improve the quality of human life, while protecting nature, by engaging in manufacturing processes that are non-polluting, conserve energy and resources and protect ecosystems; benefit employees, consumers and communities; and strengthen enterprises that foster economic growth and prosperity.

## Admission Requirements

- Ontario Secondary School Diploma (OSSD), or equivalent, or a mature applicant (<https://www.senecapolytechnic.ca/registrar/canadian-applicants/admission-requirements/mature-applicants.html>)
- English: Grade 12 C or U, or equivalent course
- Mathematics: Grade 12 C or U, or Grade 11 Functions (MCR3U), or equivalent course

Canadian citizens and permanent residents may satisfy the English and/or mathematics requirements for this program through successful Seneca

pre-admission testing. (<https://www.senecapolytechnic.ca/registrar/canadian-applicants/admission-requirements/mature-applicants.html>)

Recommended upgrading for applicants who do not meet academic subject requirements (<https://www.senecapolytechnic.ca/registrar/canadian-applicants/admission-requirements/upgrading-options.html>).

## International Student Information

International admissions requirements vary by program and in addition to English requirements (<https://www.senecapolytechnic.ca/international/apply/how-to-apply/admission-requirements/english-requirements.html>), programs may require credits in mathematics, biology, and chemistry at a level equivalent to Ontario's curriculum, or a postsecondary degree or diploma, equivalent to an Ontario university or college. Program-specific pre-requisite courses and credentials are listed with the

admission requirements on each program page. To review the academic requirements please visit: Academic Requirements - Seneca, Toronto, Canada ([senecapolytechnic.ca](https://www.senecapolytechnic.ca/international/apply/how-to-apply/admission-requirements/academic-requirements.html)) (<https://www.senecapolytechnic.ca/international/apply/how-to-apply/admission-requirements/academic-requirements.html>).

## Pathways

As a leader in academic pathways, we offer a range of options that will allow you to take your credential further in another Seneca program or a program at a partner institution.

To learn more about your eligibility, visit the Academic Pathways (<https://www.senecapolytechnic.ca/pathways.html>) web page.

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