Course Outline

Our Vision: Rooted in our communities, we will be a globally recognized college delivering innovative learning opportunities and preparing career-ready graduates to be leaders in their fields.

Mission: We are dedicated to student success, academic excellence, and leadership in our communities.

Land Acknowledgement: St. Lawrence College is situated on the traditional lands of the Haudenosaunee and Anishinaabe People. May we always be grateful to live and learn on these lands.

Technical Mathematics

Course Information

Course Code: MATH 2000

Program(s): Energy Systems Engineering Technology/Energy Systems Engineering Technician

Grade Type: Graded: Yes G/NG:

Credit Weight: 2.0

Total Course Hours: 28

Hours by Instructional Environment: Class: 28 Lab: Field: Other:

Pre-requisite(s): MATH 1004

Co-Requisite(s): None

Course Equivalencies: N/A

PLAR: Other

Experiential Learning: N/A

Sustainability Development: N/A

Campus Dean/Associate Dean Signature of Approval: Brad Burkeen

Effective Date: Fall 2024

Course Description

This course introduces vectors and the complex number system, including conversions between polar and rectangular forms. Students manipulate and solve exponential and logarithmic functions in order to apply in technical lab and theory.

Course Learning Outcomes

At the conclusion of this course, learners will be able to:

Ontario Qualifications Framework Category	Course Learning Outcomes
Depth and Breadth of Knowledge	1. Identify key elements required to complete various technical energy operations.
Knowledge of Methodologies	2. Use trigonometry to solve applied technical problems.
Application of Knowledge	3. Solve exponential and logarithmic equations. 4. Perform calculations with complex numbers in rectangular and polar forms.
Communication Skills	5. Communicate technical procedures and mathematical solutions effectively.
Awareness of the Limits of Knowledge	6. Seek advice and assistance during the learning process.
Professional Capacity/Autonomy	7. Allocate time and resources efficiently to meet deadlines and achieve desired outcomes in a professional setting.

Relationship to Vocational /Program Specific Learning Outcomes

It is expected that all of the approved provincial outcomes (or those approved in the program proposal) will be achieved during the program. This course contributes to learning by supporting the achievement of the following identified (X) vocational/program learning outcomes:

Energy Systems Engineering Technology		
#	**VLO/PLO Description**	**Assessed**
1	Collect, analyze and interpret data to determine the energy usage of residential, commercial and institutional facilities.	X
2	Contribute to the selection, design, installation, maintenance and assessment of commercially available sustainable energy systems for residential, commercial and institutional facilities.	
3	Summarize and report, through effective written and verbal communication to clients or supervisors, the findings of building energy audits and energy system designs.	
4	Recommend retrofits to buildings and sustainable energy systems based on performance, economic analysis and energy auditing.	
5	Contribute to the selection, design, installation, maintenance and assessment of conventional energy systems for residential, commercial and institutional facilities.	
6	Articulate the underlying principles of operation of energy systems for colleagues, customers and project team leaders.	
7	Apply relevant legislation, policies, standards, regulations, and best practices to the field of energy systems.	
8	Communicate detailed results of the design and analysis process to a broad audience.	
9	Use industry specific software to achieve optimal design of sustainable energy systems.	

Energy Systems Engineering Technology		
#	**VLO/PLO Description**	**Assessed**
10	Perform whole-building energy simulations, including economic analysis, on new and existing facilities.	
11	Apply project management principles to contribute to the planning, implementation and evaluation of projects.	
12	Recommend wired and wireless control and data acquisition strategies and technologies to enable effective energy management.	
13	Perform effectively as a member of an engineering team and contribute to the success of the team by applying self-management and interpersonal skills.	

Table 1: Any VLO/PLO that is associated with this course must also be assessed.

Energy Systems Engineering Technician		
#	**VLO/PLO Description**	**Assessed**
1	Collect, analyze and interpret data to determine the energy usage of residential, commercial and institutional facilities.	X
2	Contribute to the selection, design, installation, maintenance and assessment of commercially available sustainable energy systems for residential, commercial and institutional facilities.	
3	Summarize and report, through effective written and verbal communication to clients or supervisors, the findings of building energy audits and energy system designs.	
4	Recommend retrofits to buildings and sustainable energy systems based on performance, economic analysis and energy auditing.	
5	Contribute to the selection, design, installation, maintenance and assessment of conventional energy systems for residential, commercial and institutional facilities.	
6	Articulate the underlying principles of operation of energy systems for colleagues, customers and project team leaders.	
7	Apply relevant legislation, policies, standards, regulations, and best practices to the field of energy systems.	

Table 2: Any VLO/PLO that is associated with this course must also be assessed.

Essential Employability Skills

It is expected that all 11 of the Essential Employability Skills will be addressed during the certificate, diploma, and advanced diploma programs. This course contributes to learning by providing assessed feedback on the following identified (X) essential employability skills.

Type/Category	#	EES Description	Assessed
Communication	1	Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.	
	2	Respond to written, spoken, or visual messages in a manner that ensures effective communication.	
Numeracy	3	Execute mathematical operations accurately.	X
Critical Thinking and Problem Solving	4	Apply a systematic approach to solve problems.	X
	5	Use a variety of thinking skills to anticipate and solve problems.	
Information Management	6	Locate, select, organize, and document information using appropriate technology and information systems.	
	7	Analyze, evaluate, and apply relevant information from a variety of sources.	
Interpersonal	8	Show respect for the diverse opinions, values, belief systems, and contributions to others.	
	9	Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals.	
Personal	10	Manage the use of time and other resources to complete projects.	X
	11	Take responsibility for one's own actions, decisions, and consequences.	X

Table 2: Any EES that is associated with this course must also be assessed.

Course Learning Modules

The course will feature the following modules:

Module Title	Module Topic(s)	CLO*	Learning Experiences	Resources
Trigonometry	• Review of vectors • Introduction of the complex plane • Plotting	2, 1,5,6,7	Direct instruction Demonstration Hands-on practice	Materials available on Blackboard
Complex Numbers	• Components of vectors • Basic operations with complex numbers, products, quotients, powers and roots of complex numbers	4, 1,5,6,7	Direct instruction Demonstration Hands-on practice	Materials available on Blackboard
Logarithms	• Solve exponential and logarithmic equations, base 10 system (log), base e system (ln)	3, 1,5,6,7	Direct instruction Demonstration Hands-on practice	Materials available on Blackboard

**CLO: Course Learning Outcome*

Assessment Plan

Students will demonstrate learning in the following diverse ways:

Assessment Type	CLO*	VLO/PLO**	Description (e.g. format) as applicable
Assignments	1,2,3,4,5,6,7		Students will showcase their knowledge of technical mathematics.
Knowledge Check	2,3,4		Students will be tested on modular concepts using knowledge checks such as quizzes, tests, exams, etc.
Project	2,3,4		Students will complete a project that encompasses modular concepts.

**CLO: Course Learning Outcome; **VLO/PLO: Vocational Learning Outcome / Program Learning Outcome – refer to previous sections for more details.*

College Policies and Procedures

It is important for learners to familiarize themselves with the Academic Policy Manual[1]. This manual contains information on College Policies and Procedures relating to the following:

- Rights and Responsibilities of Students
- Student Academic Appeal Procedure
- Grading/Assessment Description
- Progression Policy
- Program Specific Continuance and Readmission Policy
- Prior Learning and Assessment Recognition (PLAR)
- Attendance and Participation
- Acceptable Use Policy for Computing

Academic Accommodations

St. Lawrence College is committed to creating a welcoming, barrier-free, inclusive learning environment, promoting integration and full participation. This commitment to Universal Design for Learning applies to all instructional settings (e.g., classroom, laboratory, online, placement, etc.), as well as to attitudinal beliefs. It is the policy of SLC to accommodate students with disabilities, ensuring equitable access to and benefits from educational opportunities, in accordance with the Ontario Human Rights Code.

The accommodation process is a shared responsibility. Students with disabilities seeking accommodations are asked to self-identify with Student Wellness & Accessibility[2] as early as possible to ensure timely development and implementation of appropriate accommodations.

Under provincial legislation, students are not required to provide diagnosis information, but rather, may be asked to provide information from a regulated health professional regarding functional limitations and accommodation needs, in order to provide appropriate supports. To maintain student privacy, this information is provided directly to Student Wellness & Accessibility. Once accommodation needs are determined, a member of the Student Wellness & Accessibility team will distribute an Accommodation Letter on your behalf electronically to all Professors identified within your academic schedule.

Amended: March 2023

Use of Electronic Devices

The use of electronic devices used for communications and data storage during classes is at the discretion of the course professor. The professor identifies his/her policy on this under the Special Notes about this course section.

[1]https://www.stlawrencecollege.ca/about/college-reports-and-policies/academic-policies/

[2] https://www.stlawrencecollege.ca/campuses-and-services/services-and-facilities/student-wellness-and-accessibility/

Email Account

All full-time students are provided with a St. Lawrence College email account. This is the only account that will be used by the college or your professors to communicate course or program information or college events. It is the responsibility of each learner to become familiar with and use the college email system.

Grading System

The grading scheme is applicable to all graded courses at St. Lawrence College. All final grade submissions will be numeric representing a percentage score between 0 and 100 and will be converted to letter grades automatically by the student records system, as noted in the Academic Policy Manual[3].

Maintaining Records

Learners are responsible for retaining the course outline and the current Academic Policy Manual for their records. It may be required for future use of applications for transfer credit to other programs or educational institutions.

[3] https://www.stlawrencecollege.ca/about/college-reports-and-policies/academic-policies/