

FLEMING

Course Outline

Course Title:	Renewable Energy Sources	Approval Date:	2021/9/10
Course Number:	MECH222	Academic Year:	2021
Course Hours:	45 hours		
Academic School:	School of Trades & Technology		
Faculty:	Jason Jackson - jason.jackson@flemingcollege.ca		
Program Co-ordinator or Equivalent:	Scott Moore - Scott.Moore@flemingcollege.ca		
Dean (or Chair):	Katie Surra - Katie.Surra@flemingcollege.ca		

Course Description

This course will focus on renewable energy sources used in the heating and cooling industry. Traditional heating units like electricity, gas, and oil will be compared with renewable energy sources. Students will learn the cost and benefits of using renewable energy supplies including geothermal and solar systems for the Heating Refrigeration and Air Conditioning industry.

Prerequisites: None.

Corequisites: None.

Course Delivery Type

Online Synchronous.

All course hours delivered are online synchronously with specified meeting times. Delivery times are specified on the academic timetable.

Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Assess energy efficiency and renewable energy choices using simple analysis techniques to determine best return on investment.
2. Explain LEED and the special requirements on LEED job sites.
3. Determine the benefits and limitations of various energy choices in order to determine the best choice for a particular application.
4. Apply installation techniques in accordance with best practices used within the industry.
5. Explain the principles of operation for a variety of renewable energy technologies in order to develop system troubleshooting skills.

Learning Resources

Steeby, Donald L. Alternative Energy - Sources and Systems; Delmar, Clifton Park, NY, 2012
 RETScreen Software
 Handouts (TBD)

Assessment Summary

Assessment Task	Percentage
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Assessment Task	Percentage
Labs	55%
Quizzes	20%
Tests	25%

Student Success: Policies and Procedures

Mutually, faculty and learners will support and adhere to college Academic Regulations, and Student Rights and Responsibilities. The following policies and guidelines have been developed to support the learning process.

Please click on the link for information about:

- [Academic Integrity \(2-201A\)](https://department.flemingcollege.ca/hr/attachment/7750/download)
(<https://department.flemingcollege.ca/hr/attachment/7750/download>)
- [Accessibility for Persons with Disabilities \(3-341\)](https://department.flemingcollege.ca/hr/attachment/5619/download)
(<https://department.flemingcollege.ca/hr/attachment/5619/download>)
- [Grading and Academic Standing \(2-201C\)](https://department.flemingcollege.ca/hr/attachment/7752/download)
(<https://department.flemingcollege.ca/hr/attachment/7752/download>)
- [Guidelines for Professional Practice: Students and Faculty](https://flemingcollege.ca/PDF/guidelines-for-professional-practice-students-faculty.pdf)
(<https://flemingcollege.ca/PDF/guidelines-for-professional-practice-students-faculty.pdf>)
- [Student Rights and Responsibilities \(5-506\)](https://department.flemingcollege.ca/hr/attachment/269/download)
(<https://department.flemingcollege.ca/hr/attachment/269/download>)

If you will need academic accommodations (for example if you have a learning disability, mental health condition such as anxiety or depression or if you had an IEP in high school), please contact the [Accessible Education Services \(AES\)](https://department.flemingcollege.ca/aes/) department (<https://department.flemingcollege.ca/aes/>) to meet with a counsellor.

Alternate accessible formats of learning resources and materials will be provided, on request.

Program Standards

The **Ministry of Colleges and Universities** oversees the development and the review of standards for programs of instruction. The **Ministry of Labour Training and Skills Development** oversees the development and the review of standards for programs of instruction for Apprenticeship training in the province of Ontario. Each college is required to ensure that its programs and program delivery are consistent with these standards, and must assist students to achieve these essential outcomes.

This course contributes to Program Standards as defined by the [Ministry of Colleges and Universities](#) (MCU). Program standards apply to all similar programs of instruction offered by colleges across the province. Each program standard for a postsecondary program includes the following elements:

- **Vocational standards** (the vocationally specific learning outcomes which apply to the program of instruction in question);
- **Essential employability skills** (the essential employability skills learning outcomes which apply to all programs of instruction); and
- **General education requirement** (the requirement for general education in postsecondary programs of instruction that contribute to the development of citizens who are conscious of the diversity, complexity and richness of the human experience; and, the society in which they live and work).

Collectively, these elements outline the essential skills and knowledge that a student must reliably demonstrate in order to graduate from the program. For further information on the standards for your program, follow the MCU link (www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/).

Detail Plan

Term:	2021 Fall	Session Code:	1
Faculty:	Jason Jackson - jason.jackson@flemingcollege.ca		
Program Co-ordinator or Equivalent:	Scott Moore - Scott.Moore@flemingcollege.ca		
Dean (or Chair):	Katie Surra - Katie.Surra@flemingcollege.ca		

Learning Plan

Wks/Hrs Units	Topics, Resources, Learning, Activities	Learning Outcomes	Assessment
1	Course Introduction Renewable Energy Systems	1,2	Assignment Quiz
2	LEED-Leadership in Energy and Design	2,3,4	Assignment Quiz
3	Energy Efficiency	1,3,4,5	Assignment Quiz
4	Solar Hot Water	1,3,4,5	Assignment Drawing
5	Solar PV	3,4,5	Assignment Quiz
6	Wind Energy	1,3,4,5	Assignment Quiz
7	Geothermal	1,3,4,5	Assignment Quiz
8	Independent Learning Week		
9	Biogas/Biomass	1,3,4,5,	Assignment Quiz
10	Hydro-Electric	1,2,3,4,5	Assignment Quiz
11	Fuel Cells	1,3,4,5	Assignment
12	Combined Heat and Power	1,3,4,5	Assignment Drawing
13	Nuclear Energy	1,2,3,4,5	Assignment Quiz
14	Critical Thinking - Energy	1,2,3,4,5	Online Assignment Quiz
15	Final Test	1,2,3,4,5	Final Test - On Line

Assessment Requirements

Assessment Task	Date/Weeks	Course Learning Outcome	Percentage
10 Assignments @ 2.5% each	Assignments - Weekly	1,2,3,4,5	25%
2 Drawings @ 10% each	Week 4 and 12	1,2,3	20%
10 Quizzes @ 2.5% each	Quizzes Weekly	1,2,3,4,5	25%
Test @ 10% Critical Thinking 5%	Week 7		15%
Final Test @ 10% Critical Thinking 5%	Week 15	1,2,3,4,5	15%

Theory quizzes are due at assigned times. Lab assignments are due in lab at assigned times. Faculty will not accept late submissions beyond specified due dates. Late quizzes and labs not submitted on time will be given a mark of 0%.

Lab and Lectures may change to meet the changing needs of the students.

Test will be given at specified times.

Course Outline subject to change.

Exemption Contact

scott.moore@flemingcollege.ca

Program Coordinator

Prior Learning and Assessment and Recognition (PLAR)

PLAR uses tools to help learners reflect on, identify, articulate, and demonstrate past learning which has been acquired through study, work and other life experiences and which is not recognized through formal transfer of credit mechanisms. PLAR options include authentic assessment activities designed by faculty that may include challenge exams, portfolio presentations, interviews, and written assignments. Learners may also be encouraged and supported to design an individual documentation package that would meet the learning requirements of the course. Any student who wishes to have any prior learning acquired through life and work experience assessed, so as to translate it into a college credit, may initiate the process by applying through the Registrar's office. For more information please click on the following link: <http://flemingcollege.ca/admissions/prior-learning-assessment-and-recognition>

Course Specific Policies and Procedures

It is the responsibility of the student to retain this course outline for future reference. Course outlines may be required to support applications for advanced standing and credit transfer to other educational institutions, portfolio development, PLAR and accreditation with professional associations.

Synchronous sessions may be recorded. As a result, your image, voice, name, personal views and opinions, and course work may be collected under legal authority of section 2 of the Ontario Colleges of Applied Arts and Technology Act, 2002. This information will be used for the purpose of supporting student learning. Any questions about this collection can be directed to the Privacy and Policy Officer at freedomofinformation@flemingcollege.ca or by mail to 599 Brealey Drive, Peterborough, ON K9J 7B1.

ACADEMIC RESPONSIBILITIES

Mutually, faculty and learners will support and adhere to college Academic Regulations and Student Rights and Responsibilities. In addition, the following guidelines have been developed to support the learning process.

1. To gain the most possible benefit from this skill developing course, students need to attend classes. Learning takes place when you become engaged in the learning process. Your instructor will be recording attendance data and will report absences, late arrivals and early departures to your program co-ordinator.
2. All tests and lab assignments have scheduled due/completion dates. Meeting these due dates is key to your success in this course: your instructor's feedback will add to your learning.
3. Therefore, you must write all tests with the class on the tests' assigned dates. As well, you must complete all lab assignments by the scheduled due date during the scheduled lab time.
4. You will receive a grade of zero for any test not written or lab assignment not completed unless you have made arrangements with your instructor **PRIOR TO** the due date in question.
5. Your instructor will consider a makeup for missed assignments or tests for valid reasons only; for example, documented illness or extenuating personal circumstances. These situations will be discussed on an individual basis.
6. You, the student, are responsible for making these arrangements; you're learning and success in this course is a shared goal.
7. Final grades in this course are assigned based on the level of achievement that corresponds to the assessment components as cited in the course outline. It is important to note that faculty member(s) will not offer additional evaluation activities (**NO CREDIT RECOVERY**) beyond those cited in the course outline.

LATE ASSIGNMENT POLICY

You must submit/present all written/oral assignments on their assigned dates unless you make specific arrangements in writing/voice mail/E-mail with your professor at least 24 hours prior to the due date in question. In the case of any emergency, make arrangements (in writing, if necessary) immediately upon your return.

Your professor will make special arrangements for valid reasons only. In the case of illness, you may be required to provide a medical note. Other extenuating circumstances will be discussed on an individual basis.

A penalty of 10% per day will be applied to an assignment not submitted by the original or extended due date. An assignment more than three days late will receive a grade of zero ("0"). Weekends are counted as two days. No assignment will be accepted after the last day of classes without prior arrangement with your professor.

ACADEMIC INTEGRITY

Fleming College opposes any form of academic dishonesty, such as plagiarism, submission of work for which credit has already been received; cheating, impersonation; falsification or fabrication of data; the acquisition of confidential material, e.g., examination papers; misrepresentation of facts; altering transcripts or other official documents.

Please see Academic Regulations Policy for more information on Academic Integrity.