

I. COURSE DESCRIPTION:

This is a course covering the topics of magnetism, DC machines and AC circuit theory.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Describe magnetic flux and flux density
2. Solve problems associated with magnetic energy, including magnetic potential difference, flux density, reluctance, permeance, and permeability
3. List and explain the factors that affect the magnitude and direction of induced EMF in single conductors and in coils
4. Describe factors which affect inductance and perform related calculations
5. State Fleming's hand rules
6. State and apply Lenz's law
7. Describe the creation and effects of eddy currents
8. Describe the construction, operation and characteristics of Permanent Magnet, separately excited, shunt, series and compound (cumulative and differential) DC motors and generators
9. Draw connection diagrams for all types of DC motors and generators
10. Describe a sine wave, calculate RMS average, maximum and instantaneous values
11. Explain and calculate frequency, electrical and mechanical degrees
12. Interpret and calculate phasors, vectors, and vector diagrams
13. Describe the effects of alternating voltage and current in a resistive device
14. Describe inductance, self inductance and characteristics of a coil connected to a DC source

15. Describe the characteristics of a coil connected to an AC source
16. Calculate inductive reactance, voltage, current and power of an inductive circuit
17. Describe capacitance and the characteristics of a capacitor connected to a DC source
18. Describe the characteristics of a capacitor connected to an AC source
19. Calculate the capacitive reactance, voltage, current, power and phase relationships of a capacitive circuit
20. Calculate the values for RL/RC/RLC series circuits
21. Describe and calculate resonant circuits
22. Describe and calculate resonant circuits and phase relations
23. Explain and calculate RL/RC parallel circuits
24. Label, describe and calculate values for RLC parallel circuits
25. Describe the method for testing RLC parallel circuits
26. Explain and calculate RLC parallel circuits
27. Explain and calculate the efficiency of AC loads as related to power factor correction
28. Explain the effects of power factor correction
29. Calculate power factor correction for single-phase loads
30. Describe the principles of operation of various types of single phase transformers
31. Determine and perform calculations involving turns/voltage/current ratios for single phase transformers

III. TOPICS:

1. Magnetism
2. Magnetic Induction
3. Basic Trigonometry and Vectors
4. Alternating Current (AC)
5. Inductance in AC circuits
6. Resistive-Inductive Series Circuits
7. Resistive-Inductive Parallel Circuits
8. Capacitor
9. Capacitor in AC Circuits
10. Resistive-Capacitive Series Circuits
11. Resistive-Capacitive Parallel Circuits
12. Resistive-Inductive-Capacitive Series Circuits
13. Resistive-Inductive-Capacitive Parallel Circuits
14. Single Phase Transformers
15. DC Generators
16. DC Motors

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Delmar's Standard Textbook of Electricity
By Stephen L. Herman

V. EVALUATION PROCESS/GRADING SYSTEM:

Theory 100%

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of "academic dishonesty" in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade "C", (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. Announcements, news, the academic calendar of events, class cancellations, your learning management system (LMS), and much more are also accessible through the student portal. Go to <https://my.saultcollege.ca>.

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

It is the departmental policy that once the classroom door has enclosed, the learning process has begun. Late arrivals will not be granted admission to the room.