

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** AC Circuits and Machines

**CODE NO. :** ELR1090 **SEMESTER:** 1

**PROGRAM:** Electrical/Electronics/Instrumentation Technician

**AUTHOR:** A. Gooderham, 7592554 ext 581

**DATE:** Jan. 2003 **PREVIOUS OUTLINE DATED:**  
Jan. 2002

**APPROVED:**

	_____	_____
	<b>DEAN</b>	<b>DATE</b>

**TOTAL CREDITS:** 4

**PREREQUISITE(S):** ELR 1000

**HOURS/WEEK:** 5

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*For additional information, please contact the Dean*  
*School of Technology & Natural Resources Programs*  
*(705) 759-2554, Ext. 688*

**I. COURSE DESCRIPTION:**

An analytical study of series and parallel, and series-parallel AC circuits, impedance networks, network theorems and poly-phase circuits. Fundamentals of DC circuit analysis in RC circuits is followed by AC analysis techniques in RL, RC and RLC circuits. An overview of the basic construction and operation of DC and AC machines completes the course content.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

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

1. Analyse a DC circuit containing capacitors and resistors to determine charge and discharge characteristics

Potential Elements of the Performance:

- Completion of RC cct questions regarding time constants
- Completion of RC cct questions requiring the solution of the time for threshold voltage or voltage level achievement
- Completion of test

2. Determine the impedance and operation of single-phase AC circuits using phasors and complex math.

Potential Elements of the Performance:

- Completion of complex math questions including the j operator
- Completion of basic trigonometry questions
- Completion of polar and rectangular conversions
- Analysis of single-phase circuit operation using complex math, to find impedance(s), voltage and current values
- Complete formal test

3. Analyse a three-phase cct with respect to type (Delta or Wye) and solve for both line and phase voltages and currents.

Potential Elements of the Performance:

- Completion of three-phase cct questions regarding line and phase values
  - Completion of three-phase cct questions having combinations of delta and wye generators and impedance loads
  - Completion of test
4. Analyse AC motor and generator characteristics, parts and power factor correction.

Potential Elements of the Performance:

- Completion of AC machine diagrams identifying parts of the machine
- Description of AC machine operation and characteristics
- Completion of power factor correction calculations and relationships
- Completion of test

**III. TOPICS:**

1. Capacitance
2. RC , DC Circuits
3. AC fundamentals (review)
4. Phasors & Complex Numbers
5. RL, RC & RLC AC Circuits, Resonance & Filters
6. Series-Parallel AC Circuits
7. Power in AC Circuits
8. AC Networks
9. Three-Phase AC Systems
10. Transformers
11. AC Motor/Generators
12. Three-Phase AC Motors (if time permits)

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

**Principles of Electric Circuits , 7<sup>th</sup> Ed. , by Floyd**

**V. EVALUATION PROCESS/GRADING SYSTEM:**

**Three Tests @ 33% each + Review Assignment @ 1% : TOTAL 100%**

**NOTE:** If a student misses a test or surprise quiz (maximum 5% of final grade) without contacting the instructor, the Dean's office or the switchboard prior to the test or quiz, a mark of zero will be granted without a re-write option.

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies &amp; Procedures Manual – Deferred Grades and Make-up</i> ).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has not been possible for the faculty member to report grades.	

**VI. SPECIAL NOTES:**Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.

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.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. 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.

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.

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

**VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor.

**VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.

