SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

SAULT COLLEGE

COURSE OUTLINE

COURSE TITLE: NETWORK ANALYSIS

CODE NO. : ELR309   **SEMESTER:**   SIX

PROGRAM: ELECTRICAL ENGINEERING TECHNOLOGY

AUTHOR: JUHANI (JOHN) PALONIEMI
PROFESSOR: BAZLUR RASHEED

DATE:	JAN 2017	**PREVIOUS OUTLINE DATED:**	JAN 2016

APPROVED: *"Corey Meunier"*   Dec '16

                                          CHAIR   DATE

TOTAL CREDITS: 7

PREREQUISITE(S): ELR109, MTH577

HOURS/WEEK: 5

I.   COURSE DESCRIPTION:
An in-depth study of electric circuits using network theorems, differential equations and Laplace transforms.

II.   LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1.   ***Analyze a resistive circuit using Nodal analysis and Mesh analysis.***

   Potential Elements of the Performance:
   - Using a matrix solution of the network equations, determine the voltage and current in the elements of a resistive circuit.

2.   ***Analyze First-Order circuits.***

   Potential Elements of the Performance:
   - Write and solve a differential equation for a network with resistors a capacitor.
   - Write and solve a differential equation for a network with resistors and an inductor.

3.   ***Analyze Second-Order circuits using differential equations.***
   Potential Elements of the Performance:
   - Write and solve a differential equation for a Second-Order circuit with   resistors, inductors and capacitors.
   - Solve the differential equation for a Second-Order circuit with excitation by initial conditions, excitation by a source and excitation by initial conditions and a source.
   - Write complementary, particular and complete solutions.
   - Solve for the under-damped case, critically-damped case and over-damped case.

4.   ***Analyze First-Order and Second-Order circuits using Laplace transforms.***

   Potential Elements of the Performance:
   - Define the Laplace transform.
   - Analyze a circuit with a transformed network if excited by a source.
   - Analyze a circuit by transforming the differential equation if the circuit is excited by initial conditions and a source.

III.   TOPICS:

1.   Basic Circuit Laws
2.   Resistive Networks
3.   Capacitors and Inductors
4.   First-Order Circuit Analysis
5.   Second-Order Circuit Analysis
6.   Laplace Transform Circuit Analysis

IV.   REQUIRED RESOURCES/TEXTS/MATERIALS:

Course Notes package based on Basic Circuit Theory, 3rd Ed. By
Lawrence P. Huelsman ISBN 0130584622

V.   EVALUATION PROCESS/GRADING SYSTEM:
The grading weight will be:
4 Tests (equally weighted)   100%

The following semester grades will be assigned to students:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00

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:

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.

If a student misses a test he/she must have a valid reason (i.e. medical or family emergency – documentation may be required). In addition, the instructor **must** be notified **prior** to the test sitting. If this procedure is not followed the student will receive a mark of zero on the test with no make-up option.

If a student misses class time due to sickness, family emergency or other reason beyond his/her control the student must at his/her first opportunity meet with the course faculty to discuss if the missed time has placed the student at an increased risk of failing. The student must follow up the meeting by emailing the faculty with a summary of the meeting's discussions. Documentation validating the missed time may be required.

Use of cell phones/PDAs for any form of communication (voice, text…) during class or lab time is strictly prohibited. Cell phones/PDAs must be silenced during regular class time and ***must be turned off and kept out of sight during test sittings. Failure to follow the latter requirement during a test sitting will result in a grade of 0 being assigned.***

Students may not wear earphones of any kind (i.e. for play back of recorded music/voice) during lab activities or test sittings. This does not include hearing aids required for hearing impaired.

Students are expected to maintain an active Sault College email account. They are required to check this email account daily. The instructor may announce details of test requirements and scheduling through the Sault College email system (as well as sharing other important information).

Any request to deviate from the aforementioned course outline requirements must be made to the instructor in writing or via Sault College email. If permission is granted it must also be granted in writing or via Sault College email. Verbal requests/permissions are not acceptable. It is the student's responsibility to maintain a copy of all such requests and associated permissions.

VII.   COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.