



**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 a First-Order circuit.**

Potential Elements of the Performance:

- Write and solve a differential equation for a network with resistors and a capacitor.
- Write and solve a differential equation for a network with resistors and an inductor.

**3. Analyze a Second-Order circuit 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 a First-Order and Second-Order circuit 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, 3<sup>rd</sup> 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 in postsecondary courses:

<b>Grade</b>	<b><u>Definition</u></b>	<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, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. 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.

Other:

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.

**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).