



## COURSE OUTLINE: ELR109 - AC CIR ANAL & MACH

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

<b>Course Code: Title</b>	ELR109: AC CIRCUIT ANALYSIS & MACHINES
<b>Program Number: Name</b>	4026: ELECTRICAL TN-PROC 4029: ELECTRICAL TY-PROCES 4127: ELECTRICAL TN-TRADES
<b>Department:</b>	ELECT./INSTRUMENTATION PS
<b>Semesters/Terms:</b>	21W
<b>Course Description:</b>	The student will apply network theorems to the analysis of series, parallel and series-parallel A.C. impedance networks and polyphase circuits. The student will apply concepts of complex math in analyzing A.C. and D.C. motors and generators, together with their control methods.
<b>Total Credits:</b>	5
<b>Hours/Week:</b>	5
<b>Total Hours:</b>	75
<b>Prerequisites:</b>	ELR100
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>This course is a pre-requisite for:</b>	ELN213, ELN229, ELR215, ELR232, ELR251, ELR309
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<p><b>4026 - ELECTRICAL TN-PROC</b></p> <p>VLO 1 Interpret and produce electrical and electronics drawings including other related documents and graphics.</p> <p>VLO 2 Analyze and solve routine technical problems related to electrical systems by applying mathematics and science principles.</p> <p>VLO 6 Verify acceptable functionality and apply troubleshooting techniques for electrical and electronic circuits, components, equipment, and systems under the supervision of a qualified person.</p> <p>VLO 8 Use computer skills and tools to solve routine electrical related problems.</p> <p>VLO 13 Perform tasks in accordance with relevant legislation, policies, procedures, standards, regulations, and ethical principles.</p> <p>VLO 16 Select electrical equipment, systems and components to fulfill the requirements and specifications under the supervision of a qualified person.</p> <p><b>4029 - ELECTRICAL TY-PROCES</b></p> <p>VLO 1 Analyze, interpret, and produce electrical and electronics drawings, technical reports including other related documents and graphics.</p> <p>VLO 2 Analyze and solve complex technical problems related to electrical systems by applying mathematics and science principles.</p>

Please refer to program web page for a complete listing of program outcomes where applicable.

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2020-2021 academic year.



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- VLO 6 Design, assemble, analyze, and troubleshoot electrical and electronic circuits, components, equipment and systems under the supervision of a qualified person.
- VLO 8 Use computer skills and tools to solve a range of electrical related problems.
- VLO 13 Perform and monitor tasks in accordance with relevant legislation, policies, procedures, standards, regulations, and ethical principles.
- VLO 16 Select and recommend electrical equipment, systems and components to fulfill the requirements and specifications under the supervision of a qualified person.

#### **4127 - ELECTRICAL TN-TRADES**

- VLO 1 Interpret and produce electrical and electronic drawings including other related documents and graphics.
- VLO 2 Analyze and solve routine technical problems related to electrical systems by applying mathematics and science principles.
- VLO 6 Verify acceptable functionality and apply troubleshooting techniques for electrical and electronic circuits, components, equipment, and systems under the supervision of a qualified person.
- VLO 8 Use computer skills and tools to solve routine electrical related problems.
- VLO 13 Perform tasks in accordance with relevant legislation, policies, procedures, standards, regulations, and ethical principles.
- VLO 16 Select electrical equipment, systems and components to fulfill the requirements and specifications under the supervision of a qualified person.

#### **Essential Employability Skills (EES) addressed in this course:**

- EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
- EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.
- EES 3 Execute mathematical operations accurately.
- EES 4 Apply a systematic approach to solve problems.
- EES 5 Use a variety of thinking skills to anticipate and solve problems.
- EES 6 Locate, select, organize, and document information using appropriate technology and information systems.
- EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.
- EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.
- EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.
- EES 11 Take responsibility for ones own actions, decisions, and consequences.

#### **Course Evaluation:**

Passing Grade: 50%, D

A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.

#### **Other Course Evaluation & Assessment Requirements:**

If a student misses a test or quiz, a mark of zero will be assigned with no re-write option. A test may be rescheduled in the event of a legitimate medical reason (doctor's note required) or family emergency, if the student contacts the instructor, the Dean's office, or the switchboard

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prior to the test or quiz.

Surprise Quizzes may be given for a maximum of 5% of the final grade and each quiz is attributed toward the next test's percentage value.

Rewrites will not be allowed for any test attempted.

#### 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.

#### Books and Required Resources:

Fundamentals of Electric Circuits by Bell

Publisher: Oxford Edition: 7

ISBN: 978-0-19-542524-6

#### Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Analyze a DC circuit containing capacitors and resistors, to determine charge and discharge characteristics	1.1 Calculate time constants for RC circuits 1.2 Calculate time/voltage relationships in RC circuits 1.3 Calculate require component values to achieve desired time/voltage characteristics
Course Outcome 2	Learning Objectives for Course Outcome 2
2. Explain operation, and calculate voltage, current and impedance for single-phase AC circuits using phasors and complex math.	2.1 Perform calculations involving the j operator 2.2 Perform basic trigonometry calculations 2.3 Perform conversions between polar and rectangular forms 2.4 Analyze single-phase circuits using complex math to find impedance(s), voltage and current values
Course Outcome 3	Learning Objectives for Course Outcome 3
3. Analyze three-phase circuits of both Delta and Wye configurations, and solve for line and phase voltages and currents.	3.1 Perform calculations of line and phase values for three-phase circuits 3.2 Calculate circuit values for three-phase circuits involving combinations of delta and wye sources and loads 3.3 Draw three-phase transformer connections and calculate values 3.4 Analyze ideal and real transformer models, including

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no-load and full-load phasor diagrams using R, L and C loads  
3.5 Describe the characteristics of 3-phase synchronous AC generators

**Evaluation Process and Grading System:**

<b>Evaluation Type</b>	<b>Evaluation Weight</b>
Assignments	19%
Review Assignment	1%
Tests (3 evenly weighted)	80%

**Date:**

September 2, 2020

**Addendum:**

Please refer to the course outline addendum on the Learning Management System for further information.

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