



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

Prepared: A. Gooderham

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>	19W
<b>Course Description:</b>	This course is an analytical study of series, parallel and series-parallel A.C. impedance networks, network theorems and polyphase circuits. Concurrently an introduction to A.C. and D.C. motors and generators together with their control methods is studied using complex math.
<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> <p>VLO 6 Design, assemble, analyze, and troubleshoot electrical and electronic circuits, components, equipment and systems under the supervision of a qualified person.</p>



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- 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

**Other Course Evaluation & Assessment Requirements:**

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

Surprise Quizzes may be given for a maximum of 5% of the final grade and are attributed toward the next test percentage value.

No rewrites are given 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 Completion of RC cct questions regarding time constants 1.2 Completion of RC cct questions requiring the solution of the time for threshold voltage or current level achievement 1.3 Completion of test
Course Outcome 2	Learning Objectives for Course Outcome 2
2. Determine the impedance and operation of single-phase AC circuits using phasors and complex math.	2.1 Completion of complex math questions including the $j$ operator 2.2 Completion of basic trigonometry questions 2.3 Completion of polar and rectangular conversions 2.4 Analysis of single-phase circuit operation using complex math, to find impedance(s), voltage and current values 2.5 Completion of test
Course Outcome 3	Learning Objectives for Course Outcome 3
3. Analyze a three-phase cct with respect to type (Delta or Wye) and solve for both line and phase voltages and currents.	3.1 Completion of three-phase cct questions regarding line and phase values 3.2 Completion of three-phase cct questions having combinations of delta and wye generators and impedance loads 3.3 Completion of three-phase transformer connections and values 3.4 Analysis of ideal vs real transformer model calculations, including no-load vs full-load phasor diagrams using R, L and C loads 3.5 Investigate the characteristics of 3-phase synchronous AC generators 3.6 Completion of test

**Evaluation Process and Grading System:**

Evaluation Type	Evaluation Weight	Course Outcome Assessed
Review Assignment	1%	



	Test 1	33%	
	Test 2	33%	
	Test 3	33%	

**Date:** August 22, 2018

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