



## COURSE OUTLINE: ELN213 - ELECTRONIC CIRC II

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Approved: Corey Meunier, Dean, Technology, Trades, and Apprenticeship

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| <b>Course Code: Title</b>  | ELN213: ELECTRONIC DEVICES AND CIRCUITS II  |
| <b>Program Number: Name</b>  | 4026: ELECTRICAL TN-PROC<br>4029: ELECTRICAL TY-PROCES<br>4127: ELECTRICAL TN-TRADES  |
| <b>Department:</b>   | ELECT./INSTRUMENTATION PS   |
| <b>Academic Year:</b>  | 2024-2025   |
| <b>Course Description:</b>   | This course will introduce several electronic devices and circuits used in industry, with concentration on the Thyristor family of devices. The student will study the devices, their electrical characteristics, and typical industrial applications. Emphasis is placed on the analysis and troubleshooting of circuits, as well as some simplified design. Additionally, students will be required to produce technical reports, demonstrating the ability to document technical data and results in a timely fashion. This course prepares the students for analyzing and troubleshooting circuits and systems in the AC and DC Power Control industrial environment.   |
| <b>Total Credits:</b>  | 4   |
| <b>Hours/Week:</b>   | 3   |
| <b>Total Hours:</b>  | 42  |
| <b>Prerequisites:</b>  | ELN109, ELR109  |
| <b>Corequisites:</b>   | There are no co-requisites for this course.   |
| <b>This course is a pre-requisite for:</b>   | ELR236  |
| <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 4 Assemble, test, modify and maintain electrical circuits and equipment to fulfill requirements and specifications under the supervision of a qualified person.</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><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> |
| <b>Please refer to program web page for a complete listing of program outcomes where applicable.</b> |   |



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|   | VLO 4   | Design, assemble, test, modify, maintain and commission electrical equipment and systems to fulfill requirements and specifications under the supervision of a qualified person.             |
|   | VLO 6   | Design, assemble, analyze, and troubleshoot electrical and electronic circuits, components, equipment and systems under the supervision of a qualified person.                               |
|   | <b>4127 - ELECTRICAL TN-TRADES</b>  |  |
|   | 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 4   | Assemble, test, modify and maintain electrical circuits and equipment to fulfill requirements and specifications under the supervision of a qualified person.                                |
|   | 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. |
| <b>Essential Employability Skills (EES) addressed in this course:</b> | 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 3   | Execute mathematical operations accurately.  |
|   | EES 4   | Apply a systematic approach to solve problems.   |
| <b>Course Evaluation:</b>   | Passing Grade: 50%, D   |  |
|   | A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.   |  |
| <b>Other Course Evaluation &amp; Assessment Requirements:</b>         | Student must achieve at least 50% in both the theory and lab components in order to pass the course.  |  |
|   | Grade<br>Definition Grade Point Equivalent<br>A+ 90 - 100% 4.00<br>A 80 - 89%<br>B 70 - 79% 3.00<br>C 60 - 69% 2.00<br>D 50 - 59% 1.00<br>F (Fail) 49% and below 0.00   |  |
|   | CR (Credit) Credit for diploma requirements has been awarded.<br>S Satisfactory achievement in field /clinical placement or non-graded subject area.<br>U Unsatisfactory achievement in field/clinical placement or non-graded subject area.<br>X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.<br>NR Grade not reported to Registrar's office.<br>W Student has withdrawn from the course without academic penalty. |  |
| <b>Course Outcomes and Learning Objectives:</b>                       | <b>Course Outcome 1</b>   | <b>Learning Objectives for Course Outcome 1</b>  |
|   | 1. Describe the   | 1.1 Describe the operation of Industrial OPAMP circuits and  |

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|  | characteristics and operation of industrial based devices. Perform analysis and testing of circuits employing these device in typical industrial applications. | systems including (but not limited to) Comparators, Schmitt Triggers, Integrators and Differentiators.<br>1.2 Calculate the output characteristics of circuits employing OPAMPS.<br>1.3 Describe the operation of, and calculate typical Timing Circuits including (but not limited to) Linear Capacitor Charging and Astable and Monostable Integrated Timer Circuits<br>1.4 Describe the operation of various semiconductor and thyristor devices including (but not limited to) common 4-Layer devices.<br>1.5 Analyze and solve circuits in AC and DC Power control systems(Single Phase).<br>1.6 Correctly select / replace devices in applications based on operational requirements and characteristics.<br>1.7 Perform In / Out of circuit testing to determine component functionality. |
|  | <b>Course Outcome 2</b>  | <b>Learning Objectives for Course Outcome 2</b>  |
|  | 2. Analyze, test and troubleshoot electronic circuits.   | 2.1 Accurately analyze the operation of typical industrial circuits employing typical electronic devices outlined.<br>2.2 Perform simple AC and/or DC calculations of common circuits to determine the operation / functionality.<br>2.3 Correctly test circuits for functionality, using common and specialized test equipment.<br>2.4 Correctly and accurately troubleshoot malfunctioning circuits.   |
|  | <b>Course Outcome 3</b>  | <b>Learning Objectives for Course Outcome 3</b>  |
|  | 3. Design and modify simple industrial circuits.   | 3.1 Design simple industrial control circuits employing common devices outlined.<br>3.2 Correctly modify existing circuits for changing operating characteristics and conditions.  |

**Evaluation Process and Grading System:**

| Evaluation Type                   | Evaluation Weight |
|-----------------------------------|-------------------|
| Lab Reports and Practical Test(s) | 50%               |
| Theory Tests and Quizzes          | 50%               |

**Date:**

August 9, 2024

**Addendum:**

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

