



# COURSE OUTLINE

## ELN213

Prepared: J. Paloniemi / Ed Sowka    Approved: Corey Meunier

<b>Course Code: Title</b>	ELN213: ELECTRONIC DEVICES AND CIRCUITS II
<b>Program Number: Name</b>	4026: ELECTRICAL TN-PROC
<b>Department:</b>	ELECT./INSTRUMENTATION PS
<b>Semester/Term:</b>	17F
<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>	4
<b>Total Hours:</b>	60
<b>Prerequisites:</b>	ELN109, ELR109
<b>This course is a pre-requisite for:</b>	ELR236
<b>Vocational Learning Outcomes (VLO's):</b>	<p>#1. Interpret and produce electrical and electronics drawings including other related documents and graphics.</p> <p>#2. Analyze and solve routine technical problems related to electrical systems by applying mathematics and science principles.</p> <p>#4. Assemble, test, modify and maintain electrical circuits and equipment to fulfill requirements and specifications under the supervision of a qualified person.</p> <p>#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>#13. Perform tasks in accordance with relevant legislation, policies, procedures, standards, regulations, and ethical principles.</p>
<b>Please refer to program web page for a complete listing of program outcomes where applicable.</b>	



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<b>Essential Employability Skills (EES):</b>	<p>#1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.</p> <p>#3. Execute mathematical operations accurately.</p> <p>#4. Apply a systematic approach to solve problems.</p>								
<b>Course Evaluation:</b>	Passing Grade: 50%, D								
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	<p>Student must achieve at least 50% in both the theory and lab components in order to pass the course.</p> <p>Grade Definition Grade Point Equivalent</p> <p>A+ 90 – 100% 4.00</p> <p>A 80 – 89%</p> <p>B 70 - 79% 3.00</p> <p>C 60 - 69% 2.00</p> <p>D 50 – 59% 1.00</p> <p>F (Fail) 49% and below 0.00</p> <p>CR (Credit) Credit for diploma requirements has been awarded.</p> <p>S Satisfactory achievement in field /clinical placement or non-graded subject area.</p> <p>U Unsatisfactory achievement in field/clinical placement or non-graded subject area.</p> <p>X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.</p> <p>NR Grade not reported to Registrar's office.</p> <p>W Student has withdrawn from the course without academic penalty.</p>								
<b>Evaluation Process and Grading System:</b>	<table border="1"> <thead> <tr> <th>Evaluation Type</th> <th>Evaluation Weight</th> </tr> </thead> <tbody> <tr> <td>1st Year Review Test</td> <td>5%</td> </tr> <tr> <td>Lab Reports and Practical Test(s)</td> <td>50%</td> </tr> <tr> <td>Theory Tests and Quizzes</td> <td>45%</td> </tr> </tbody> </table>	Evaluation Type	Evaluation Weight	1st Year Review Test	5%	Lab Reports and Practical Test(s)	50%	Theory Tests and Quizzes	45%
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<b>Books and Required Resources:</b>	<p>Introductory Electronic Devices and Circuits by Robert T. Paynter                      Publisher: Pearson Edition: 7th or newer                      ISBN: 0131716417</p>								
<b>Course Outcomes and Learning Objectives:</b>	<p><b>Course Outcome 1.</b></p>								



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Describe the characteristics and operation of industrial based devices. Perform analysis and testing of circuits employing these device in typical industrial applications.

### **Learning Objectives 1.**

Describe the operation of Industrial OPAMP circuits and systems including (but not limited to) Comparators, Schmitt Triggers, Integrators and Differentiators.

Calculate the output characteristics of circuits employing OPAMPS.

Describe the operation of, and calculate typical Timing Circuits including (but not limited to) Linear Capacitor Charging and Astable and Monostable Integrated Timer Circuits

Describe the operation of various semiconductor and thyristor devices including (but not limited to) SCR's, DIAC's TRIAC's, UJT's, PUT's as well as other common 4-Layer devices.

Analyze and solve circuits in AC and DC Power control systems (Single Phase).

Correctly select / replace devices in applications based on operational requirements and characteristics.

Perform In / Out of circuit testing to determine component functionality.

### **Course Outcome 2.**

Analyze, test and troubleshoot electronic circuits.

### **Learning Objectives 2.**

Accurately analyze the operation of typical industrial circuits employing typical electronic devices outlined.



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Perform simple AC and/or DC calculations of common circuits to determine the operation / functionality.

Correctly test circuits for functionality, using common and specialized test equipment.

Correctly and accurately troubleshoot malfunctioning circuits.

### **Course Outcome 3.**

Design and modify simple industrial circuits.

### **Learning Objectives 3.**

Design simple industrial control circuits employing common devices outlined.

Correctly modify existing circuits for changing operating characteristics and conditions.

**Date:**

Tuesday, September 5, 2017

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