



## COURSE OUTLINE: ELN100 - ELECTRONIC FUNDAMENTALS I

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

<b>Course Code: Title</b>	ELN100: ELECTRONIC FUNDAMENTALS I
<b>Program Number: Name</b>	4026: ELECTRICAL TN-PROC 4029: ELECTRICAL TY-PROCES
<b>Department:</b>	ELECT./INSTRUMENTATION PS
<b>Semesters/Terms:</b>	18F
<b>Course Description:</b>	This course introduces the student to foundational electronic theory, electronic devices and circuit applications as well as common electronic test equipment. Diodes (Rectifier, Zener, Light-Emitting), Resistors, Capacitors, Transformers and their applications in Linear DC Power Supplies will be studied in detail. Hands on skills will be developed in the practical component of this course, which includes device testing, circuit assembly, analysis and troubleshooting. A final project consisting of proto-typing, testing and constructing a Linear Adjustable DC Power Supply, will enhance skills in the use of common test equipment, constructions/assembly techniques, as well as technical documentation/reporting.
<b>Total Credits:</b>	5
<b>Hours/Week:</b>	5
<b>Total Hours:</b>	75
<b>Prerequisites:</b>	There are no pre-requisites for this course.
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>This course is a pre-requisite for:</b>	ELN109, ELN210, ELN229
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4026 - ELECTRICAL TN-PROC</b> VLO 1 Interpret and produce electrical and electronics drawings including other related documents and graphics. 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 12 Apply health and safety standards and best practices to workplaces.
<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 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.

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



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- 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 10 Manage the use of time and other resources to complete projects.
- EES 11 Take responsibility for ones own actions, decisions, and consequences.

**Course Evaluation:**

Passing Grade: 50%, D

**Other Course Evaluation & Assessment Requirements:**

To successfully pass this course, the student must receive passing grades for both the Test and Evaluation portion of the class AND the Laboratory portion.

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:**

Introductory Electronic Devices and Circuits by Robert T. Paynter  
 Publisher: Pearson Custom ElectronicsTechnology Publishing Edition: Custom Edition  
 ISBN: 978-1-269-26047-3  
 Available in Campus Book Store

**Course Outcomes and Learning Objectives:**

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Accurately communicate the key elements of atomic theory as it relates to the formation and operation of a P-N Junction.	1.1 Describe the makeup of the atom. 1.2 State the relationship between the number of valence electrons and the conductivity of the element. 1.3 Contrast/Compare between trivalent and pentavalent elements 1.4 List the similarities and differences between n-type and p-type semiconductors. 1.5 Explain how a pn junction is formed. 1.6 Define bias and describe the different methods of forward and reverse biasing a pn junction.
Course Outcome 2	Learning Objectives for Course Outcome 2
2. Describe diode characteristics and operation.	2.1 Describe the construction of a diode. 2.2 Compare Silicon and Germanium diodes characteristics and operational requirements. 2.3 Correctly identify the terminals of a diode and be able to draw and analyze the schematic diagram of a simple diode circuit.



	<p>2.4 Describe and Demonstrate how to test a diode in and out of circuit with an analog or digital meter.</p> <p>2.5 Using a specification sheet, list and define the parameters and operating characteristics of different diodes.</p> <p>2.6 Discuss and compare the basic operating principles of rectifier diodes, zener diodes and light-emitting diodes (LEDs).</p> <p>2.7 Calculate Diode Voltage and Current as well as circuit voltages and currents in electric circuits implementing Silicon or Germanium diodes, Zener Diodes and Light-Emitting Diodes.</p>
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
3. Describe the operation of common diode applications.	<p>3.1 Draw the block diagram of a Linear DC power supply and describe the function of each circuit it contains.</p> <p>3.2 Describe the operation of the half-wave, full-wave and bridge rectifiers.</p> <p>3.3 Recall the equations used to solve for rectifier circuits.</p> <p>3.4 Calculate Load Voltage and Load Current of the three types of rectifiers.</p> <p>3.5 Explain the effects that filtering has on the output of a rectifier.</p> <p>3.6 Identify and describe various types of power supply filters.</p> <p>3.7 Calculate Load Voltage and Load Current of Filtered rectifiers.</p> <p>3.8 Describe different voltage and current regulators including Zener Regulators and Integrated Circuit Regulators.</p> <p>3.9 Perform calculations to justify proper operation of the power supply.</p> <p>3.10 Assemble and test power supply circuits using proper test equipment.</p> <p>3.11 Troubleshoot various linear power supplies in a safe and proper manner.</p>
<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>
4. Fabricate and Test a Complete Linear DC Power Supply.	<p>4.1 Prototype a complete Linear DC Power Supply (Construct and Test)</p> <p>4.2 Perform all required Calculations and Measurement prior to final assembly.</p> <p>4.3 Properly solder all required components.</p> <p>4.4 Correctly assemble all components implementing common shop practices and assembly techniques.</p> <p>4.5 Accurately produce a Technical Report as per criteria provided by instructor.</p>

**Evaluation Process and Grading System:**

Evaluation Type	Evaluation Weight	Course Outcome Assessed
Lab Test	10%	All
Laboratory Assignments	30%	All
Theory Tests and Quizzes	60%	All

**Date:**

August 22, 2018

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

