COURSE OUTLINE: ELR114 - MEASURE & SHOP PRAC

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Course Code: Title	ELR114: MEASUREMENT & SHOP PRACTICE
Program Number: Name	4026: ELECTRICAL TN-PROC 4029: ELECTRICAL TY-PROCES 4127: ELECTRICAL TN-TRADES
Department:	ELECT./INSTRUMENTATION PS
Academic Year:	2022-2023
Course Description:	In this course, the student will gain an understanding of the operating principles, characteristics, and application of electrical/electronic measuring instruments. The student will learn to identify and test electrical components, and correctly take electrical measurements in a circuit. The student will learn soldering and hand tool skills in a lab setting, and build a working power supply.
Total Credits:	3
Hours/Week:	2
Total Hours:	30
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4026 - ELECTRICAL TN-PROC** VLO 1 Interpret and produce electrical and electronics 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 3 Use, verify, and maintain instrumentation equipment and systems. 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. VLO 8 Use computer skills and tools to solve routine electrical related problems. VLO 10 Prepare and maintain records and documentation systems. VLO 12 Apply health and safety standards and best practices to workplaces. VLO 13 Perform tasks in accordance with relevant legislation, policies, procedures, standards, regulations, and ethical principles. VLO 14 Configure installation and apply electrical cabling requirements and system grounding and bonding requirements for a variety of applications under the supervision of a qualified person. VLO 16 Select electrical equipment, systems and components to fulfill the requirements and

specifications under the supervision of a qualified person.

VLO 17 Apply project management principles to assist in the implementation of projects.

4029 - ELECTRICAL TY-PROCES

VLO 1 Analyze, interpret, and produce electrical and electronics drawings, technical reports including other related documents and graphics.

VLO 2 Analyze and solve complex technical problems related to electrical systems by applying mathematics and science principles.

VLO 3 Design, use, verify, and maintain instrumentation equipment and systems.

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.

VLO 8 Use computer skills and tools to solve a range of electrical related problems.

VLO 10 Prepare reports and maintain records and documentation systems.

VLO 12 Apply and monitor health and safety standards and best practices to workplaces.

VLO 13 Perform and monitor tasks in accordance with relevant legislation, policies, procedures, standards, regulations, and ethical principles.

VLO 14 Configure installation and apply electrical cabling requirements and system grounding and bonding requirements for a variety of applications under the supervision of a qualified person.

VLO 16 Select and recommend electrical equipment, systems and components to fulfill the requirements and specifications under the supervision of a qualified person.

VLO 17 Apply project management principles to contribute to the planning, implementation, and evaluation of projects.

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 3 Use, verify, and maintain instrumentation equipment and systems.

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.

VLO 8 Use computer skills and tools to solve routine electrical related problems.

VLO 10 Prepare and maintain records and documentation systems.

VLO 12 Apply health and safety standards and best practices to workplaces.

VLO 13 Perform tasks in accordance with relevant legislation, policies, procedures, standards, regulations, and ethical principles.

VLO 14 Configure installation and apply electrical cabling requirements and system

		grounding and bonding requirements for a variety of applications under the supervision of a qualified person.
	VLO 16	Select electrical equipment, systems and components to fulfill the requirements and specifications under the supervision of a qualified person.
	VLO 17	Apply project management principles to assist in the implementation of projects.
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 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 A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.	
Other Course Evaluation & Assessment Requirements:	Submit all lab reports complete and on time, in the format specified by the Instructor. Satisfactorily complete the practical test. Submit a power supply report, and demonstrate a working power supply. If any of the above are not completed, an Incomplete grade will result. If needed, a second attempt for the practical test is permitted, with a maximum possible grade of 50%. 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:

Parts Package
First Year Electronic Parts Package (Breadboard, Components, Safety Glasses, etc)
AVAILABLE FROM INSTRUCTOR

Basic Tools
Basic Hand Tools (Not in Parts Package - Instructor will provide a list.)

Course Outcomes and Learning Objectives:

Course Outcome 1	**Learning Objectives for Course Outcome 1**
1. Identify common electronic components, their electrical characteristics and testing procedures.	1.1 Identify common components by their physical properties. 1.2 Identify electrical characteristics of common components. 1.3 Identify and draw the schematic symbols of common components. 1.4 Perform basic testing of common components. 1.5 Recall and accurately apply the Resistor/Capacitor/Inductor Colour Code.
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Correctly and accurately measure AC and DC Voltage, Current and Resistance using common Test Equipment.	2.1 Recall and apply basic techniques for measuring voltage, current and resistance. 2.2 Measure V, I, and R in Series Circuits, Parallel Circuits and Combination Resistive Circuits. 2.3 Define and explain the Loading Effect of meters. 2.4 Correctly wire and test an SPST switch, light and receptacle. 2.5 Correctly wire and test 3-way switches and a light. 2.6 Correctly wire and test a split receptacle and a switched receptacle. 2.7 Calibrate an oscilloscope, and use it to accurately measure amplitude and period of sinusoidal waveforms.
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. Correctly identify and safely use common hand tools as well as soldering and de-soldering equipment to build and modify electric circuits.	3.1 Correctly identify common hand tools and their use. 3.2 Correctly and safely use common hand tools. 3.3 Correctly and safely use soldering/de-soldering equipment to make simple wire connections and to remove/insert components on printed circuit boards (PCBs)
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Demonstrate standard soldering, wiring and assembly techniques in building a working DC power supply.	4.1 Correctly insert components on the PCB. 4.2 Correctly solder components on the PCB. 4.3 Build, demonstrate and explain the operation of an enclosed DC power supply.

Evaluation Process and Grading System:	<table><tr><th>Evaluation Type</th><th>Evaluation Weight</th></tr><tr><td>Lab Reports</td><td>50%</td></tr><tr><td>Power Supply Project</td><td>25%</td></tr><tr><td>Practical Lab Test</td><td>25%</td></tr></table>
Date:	August 15, 2022
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.