COURSE OUTLINE: ELR822 - INSTRUMENTATION 3

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Approved: Martha Irwin - Dean

Course Code: Title	ELR822: INSTRUMENTATION - LEVEL 3
Program Number: Name	6522: CONST & MTCE ELE ADV 6542: IND.ELECT. - ADVCD.
Department:	ELEC. APPRENTICES
Academic Year:	2025-2026
Course Description:	This course will introduce the student to instrumentation theory relating to the principles of process control systems. The student will be able to explain the terminology used in instrumentations systems, the elements of process control systems and PID control. The theory is supported by appropriate labs.
Total Credits:	4
Hours/Week:	3
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.**	**6522 - CONST & MTCE ELE ADV** VLO 1 Const and Maint Electrician **6542 - IND.ELECT. - ADVCD.** VLO 1 Industrial Electrician - Adv
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:	The student must pass both the written tests and the practical tests to pass the course. Smart watches, smart phones and similar devices are not allowed during tests or quizzes and must be removed. Smart phones are not acceptable for use as a calculator during a test or quiz. 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:	Lab Volt Process Control Training Manual by Sault College Publisher: AK Graphics LABVOLT ELN229 (Sault Coll)

Course Outcomes and Learning Objectives:

Course Outcome 1	**Learning Objectives for Course Outcome 1**
1. Understand and demonstrate the use of PID process controls.	1.1 Explain the principles of PID control. 1.2 Explain the principles of measured variable vs controlled variable, feedback, open loop vs. closed loop, and transducers. 1.3 Connect and test a PID controlled process to demonstrate the effects of varying the P, I, and D parameters. 1.4 Revise and explain control loops on instrumentation drawings using ISA standards.
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Understand pneumatic systems.	2.1 Describe the use of and list requirements for instrumentation air supplies. 2.2 Describe the theory of operation and the typical application of proportional 3-15 psi pneumatic instrumentation systems. 2.3 Identify the ISA and European symbols used for pneumatic control devices.
Course Outcome 3	**Learning Objectives for Course Outcome 3**

	3. Understand final control elements and position measurement devices.	3.1 Describe the construction and application of mechanically and electrically operated directional control valves. 3.2 Explain the operation and application of typical position measurement devices found in industry including shaft encoders, resolvers, proximity switches, LVDT`s, and synchros.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments and Quizes	10%
Labs	20%
Practical Tests	20%
Written Tests	50%

Date: August 1, 2025

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