



COURSE OUTLINE: ELR822 - INSTRUMENTATION 3

Prepared: Randy Clouthier

Approved: Corey Meunier, Chair, Technology and Skilled Trades

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| Course Code: Title | ELR822: INSTRUMENTATION - LEVEL 3 |
| Program Number: Name | 6522: CONST & MTCE ELE ADV |
| Department: | ELEC. APPRENTICES |
| Semesters/Terms: | 21W |
| Course Description: | Upon successful completion of Instrumentation III, the apprentice is able to: describe: explain the terminology of instrumentation systems: explain the principles of On/Off control: identify the four basic elements of control: explain automatic control: Explain the operation and application of position measurement devices: Explain the principles of PID control: Revise and explain loops on instrumentation drawings. /understand pneumatic systems. |
| 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. |
| Essential Employability Skills (EES) addressed in this course: | <p>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.</p> <p>EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>EES 3 Execute mathematical operations accurately.</p> <p>EES 4 Apply a systematic approach to solve problems.</p> <p>EES 5 Use a variety of thinking skills to anticipate and solve problems.</p> <p>EES 6 Locate, select, organize, and document information using appropriate technology and information systems.</p> <p>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.</p> <p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p> <p>EES 11 Take responsibility for ones own actions, decisions, and consequences.</p> |
| Course Evaluation: | Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation. |

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2020-2021 academic year.



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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

Course Outcomes and Learning Objectives:

| Course Outcome 1 | Learning Objectives for Course Outcome 1 |
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| Explain the principles of measured variable vs controlled variable. Feed back, open loop vs. closed loop, transducers. | |
| Course Outcome 2 | Learning Objectives for Course Outcome 2 |
| Describe the use of and list requirements for instrumentation air supplies. | |
| Course Outcome 3 | Learning Objectives for Course Outcome 3 |
| Describe the construction and application of mechanical and electrical operated valves. | |
| Course Outcome 4 | Learning Objectives for Course Outcome 4 |
| Identify the ISA and European symbols used for pneumatic control devices. | |
| Course Outcome 5 | Learning Objectives for Course Outcome 5 |
| Describe the theory of operation and the typical | |

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| | application of proportional 3-15 psi pneumatic instrumentation systems. | |
| | Course Outcome 6 | Learning Objectives for Course Outcome 6 |
| | Explain the operation and application of typical position measurement devices found in industry including shaft encoders, resolvers, proximity switches, LVDTs, and synchros. | |
| | Course Outcome 7 | Learning Objectives for Course Outcome 7 |
| | Explain the principles of PID control. | |
| | Course Outcome 8 | Learning Objectives for Course Outcome 8 |
| | Connect and test PID controlled process to demonstrate the effects of varying P,I and D. | |
| | Course Outcome 9 | Learning Objectives for Course Outcome 9 |
| | Revise and explain control loops on instrumentation drawings using ISA standards. | |

Evaluation Process and Grading System:

| Evaluation Type | Evaluation Weight |
|-------------------------|-------------------|
| Assignments and Quizzes | 10% |
| Labs | 20% |
| Practical Tests | 20% |
| Written Tests | 50% |

Date: August 18, 2020

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

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