

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Instrumentation III

CODE NO. ELR822

SEMESTER:

PROGRAM: Construction & Maintenance Electrician
Apprenticeship

AUTHOR: Frank Musso

DATE: March
2009

PREVIOUS OUTLINE DATED:

APPROVED:

“Corey Meunier”
CHAIR

DATE

TOTAL CREDITS:

PREREQUISITE(S):

HOURS/WEEK:

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For additional information, please contact Corey Meunier, Chair
School of Technology & Skilled Trades
(705) 759-2554, Ext. 2610

I. COURSE DESCRIPTION:

Upon successful completion of Instrumentation –3.05, the apprentice is able to: describe the use and list the requirements for instrumentation air supplies: explain the terminology of instrumentation systems: describe the operation and application of proportional 3-15 psi pneumatic systems: connect and adjust pneumatic control valves to I/P: calibrate typical pneumatic valves: 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.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Explain the principles of measured variable vs controlled variable. Feed back, open loop vs. closed loop, transducers
2. Describe the use of and list requirements for instrumentation air supplies.
3. Describe the construction and application of mechanical and electrical operated valves.
4. Identify the ISA and European symbols used for pneumatic control devices.
5. Describe the theory of operation and the typical application of proportional 3-15 psi pneumatic instrumentation systems.
6. Calibrate typical pneumatic valves,
7. Explain the operation and application of typical position measurement devices found in industry including shaft encoders, resolvers, proximity switches, LVDTs, and synchros.
8. Explain the principles of PID control.
9. Connect and test PID controlled process to demonstrate the effects of varying P,I and D.
10. Revise and explain control loops on instrumentation drawings using ISA standards.

III. TOPICS:

1. Control Elements
2. PID Tuning
3. Types of controls
4. Pneumatic Systems
5. Valves
6. ISA and European Standards

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Industrial Control Electronics: Devices, Systems & Applications
by Bartlet

V. EVALUATION PROCESS/GRADING SYSTEM:

Theory = 50% - 3 tests

Labs = 50% - The controller – Hooking up and tuning 3 loops – Calibration of pneumatic valve – Cascaded control

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
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.	

VI. SPECIAL NOTES:Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.