

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: INSTRUMENTATION/PROCESS CONTROL I

Code No.: ELN 222

Program: ELECTRICAL/ELECTRONIC TECHNICIAN

Semester: FOUR

Date: JANUARY 1985

Author: ROB PALO

New: _____ Revision: X

APPROVED: *J.P. Crozietto*
Chairperson

Date 85/01/05

Instrumentation/Process Control

ELN 222

Course Name

Course Number

PHILOSOPHY/GOALS:

This course is intended to introduce the electrical/electronic technician to process measurement and control.

METHOD OF ASSESSMENT (GRADING METHOD):

1. Written tests are conducted at regular intervals and assigned equal weight. Missed tests are graded zero percent provided a legitimate excuse such as illness can be supported by doctor's certificate. Comprehensive make-up tests will be conducted at the end of the semester for people with missed tests and legitimate excuses.
2. 70% for tests.
30% for labs.
3. Lecture and lab attendance are mandatory.

GRADES:

"A" - 80 - 100%
"B" - 66 - 79%
"C" - 55 - 65%
"R" - Repeat

TEXTBOOK(S):

Industrial Solid State Electronics, by Maloney

Fundamentals of Process Control Theory, by Murril

BLOCK	TOPIC	HOURS
1	Input transducers Measuring devices	6
2	Feedback systems and servomechanisms	12
3	Final correcting devices and amplifiers	6
4	Nine examples of closed loop industrial systems	6

BLOCK 1 - INPUT TRANSDUCERS

1. The student shall understand the theory and method of operation for the following
 - a) Potentiometers
 - b) LVDT's
 - c) Pressure transducers
 - d) Thermocouples
 - e) Thermistors and RTD's
 - f) Photo cells and photo electric devices
 - g) Strain gauges
 - h) Tachometers
 - i) Humidity transducers

BLOCK 2 - FEEDBACK SYSTEMS

1. The student will be able to describe the principle of operation and predict the behaviour to a step input for the following
 - a) Open loop system
 - b) Closed loop system
 - c) On-Off control
 - d) Proportional control
 - e) Proportional plus integral
 - f) Proportional plus integral plus derivative
 - g) Process response

BLOCK 3 - FINAL CORRECTING DEVICES

1. The student shall be able to describe the principle of operation and predict the behaviour of the following devices
 - a) Solenoid valves
 - b) 2 position electric motor driven valves
 - c) Electropneumatic valves

- d) Electrohydraulic valves
- e) Valve flow characteristics
- f) Relay and contactors
- g) Thyristors
- h) Split phase AC motors
- i) AC servo motors
- j) Solid state AC servo amps
- k) DC servo motors
- l) Amps for DC servo motors

BLOCK 4 - NINE INDUSTRIAL CONTROL SYSTEMS

1. The student shall be able to describe the following control systems.
 - a) Thermistor control of quench oil temp.
 - b) A proportional mode pressure control system.
 - c) A proportional plus reset temperature controller with thermocouple I/P
 - d) A strip tension controller
 - e) Edge guide control for a strip recoiler
 - f) An auto weighing system
 - g) A carbon dioxide controller for a for a carburizing furnace
 - h) control of relative humidity in a textile moistening process
 - i) A warehouse humidity controller.