

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: CONTROL SYSTEMS I
Code No.: ELN 214-6
Program: ELECTRICAL ENGINEERING TECHNOLOGY
Semester: II
Date: JANUARY, 1985
Author: R. PALO

New: _____ Revision: x

APPROVED:

R. Palo _____
Chairperson Date

CONTROL SYSTEMS I

ELN 214-6

Course Name

Course Number

PHILOSOPHY/GOALS:

To provide a basic understanding of feedback control systems emphasizing servomechanical applications. Introducing digital control via programmable logic controllers.

METHOD OF ASSESSMENT (GRADING METHOD):

1. Written Tests will be conducted at regular intervals.
2. Gradingn

A - 76 - 100%
B - 66 - 75%
C - 50 - 65%
R - LESS THAN 50%

Course mark - 70% Tests and 30% Lab Work

TEXTBOOK(S):

484 User's Manual ML484CREVB

REFERENCE TEXT(s):

Introduction to Control System Technology - 2nd Edition by Bateson

Introduction to Feedback Control Systems by Perklles Emmanuel & Edward Leff.

COURSE OUTLINE:

LECTURE HOURS

TOPIC

10

1. GENERATOR CONTROL THEORY
 - a) Block diagrams
 - b) Open loop & closed loop control
 - c) Advantages of automatic control
 - d) Load changes
 - e) Objectives of a control system
 - f) Damping & stability
 - g) Criteria for good control
 - h) Classification of control systems
 - i) Examples of types of control

10

2. MEASURING MEANS
 - a) Measuring means characteristics
 - b) Position & Displacement
 - c) Speed
 - d) Acceleration
 - e) Force & torque

10

3. ELECTRONIC ANALOG CONTROLLERS
 - a) OP amps
 - b) Inverters
 - c) Phase shifters
 - d) Summers
 - e) Multiplication by a constant
 - f) Solving algebraic equations
 - g) Integrators
 - h) Differentiators
 - i) Zero crossing detectors
 - j) Precision diodes
 - k) Precision clamps
 - l) Square root extractors
 - m) Basic control modes
 - n) 2 position control
 - o) Floating control
 - p) Proportional control
 - q) Integral control
 - r) Proportional plus integral
 - s) Derivative control
 - t) Proportional plus derivative
 - u) Proportional plus integral plus derivative control

6

4. FINAL CONTROL ELEMENTS
 - a) Solid state control elements
 - b) Stepping motors

- c) Stepper motor control
 - d) Armature controlled DC motor
 - e) 2 phase AC motors and selsyns
 - f) Rotating amplifiers
- 6
- 5. DIGITAL INTERFACING
 - a) D/A & A/D converters
 - b) Sample hold CCTS
 - c) Multiplexers

42 TOTAL

PLC'S

- 2
- 1. PROGRAMMABLE LOGIC CONTROLLERS
 - a) Hardware configuration
 - b) I/O addressing
- 4
- 2. MODICON 484
 - a) Memory map
 - b) Logic symbols
 - c) Ladder diagrams
 - d) Arithmetic
 - e) Timers
 - f) Counters
 - g) Sequencers
 - h) BCD conversion
 - i) Using the P180 programming panel - entering a network, running and debugging it
- 4
- 3. A - B MINI-PLC-2
 - a) Memory Map
 - b) Relay type instruments
 - c) Timers
 - d) Counters
 - e) Data transfer
 - f) Comparison
 - g) Arithmetic
 - h) Using the Mini-PLC-2 Programmable panel

10 HOURS TOTAL