SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title:	PROCESS CONTROL
Code No.:	PPE 344-5
Program:	PULP & PAPER/WATER RESOURCES ENGINEERING TECHNOLOGY
Semester	FIVE
Date:	DECEMBER, 1985
Author:	JOHN K. THEIL

New: Revision: X (2)

APPROVED:  /Mi-, /:s/-r>

Chairperson Date

CALENDAR DESCRIPTION

PROCESS CONTROL	PPE 344-5
Course Name	Course Number

PHILOSOPHY/GOALS;

The course is designed to provide theoretical and practical knowledge of the fundamentals of process control systems. Particular emphasis is placed upon the functioning of the various components, including measuring devices and transducers, transmitters, controller, and final control elements. The course also includes the use of microcomputers in process control loops. The specific objectives are given on the attached.

METHOD OF ASSESSMENT (GRADING METHOD);

Assignments	25%
Midterm examination	25%
Final examination	50%

GRADING

A	**80 - 100%**
B	**70 - 79%**
C	**60 - 69%**
D	**50 - 59%**

A passing grade will be based on a minimum composite grading of 60%. Students obtaining a composite grading of 55 to 59% may be allowed to complete a supplementary examination.

TEXTBOOK(S):

Instrumentation, Third Edition; by F. W. Kirk and N. R. Rimboi. American Technical Publishers, Inc.

REFERENCES:

Automation and Instrumentation, AWWA Manual M2, Second Edition, American Water Works Society.

Process Instrumentation and Control Systems - Manual of Practice No. OM-6 Water Pollution Control Federation.

OBJECTIVES

The student will be able to:

1. Describe applications of project control and recognize the basic control types.
2. Identify the functions of the components of a control loop and explain the difference between an open loop and a closed loop control using block diagrams.
3. Define and apply the principles of hydrostatics and fluid mechanics.
4. Classify transducers with respect to their electrical principles and recognize their typical measurement applications.
5. Describe the function of a transmitter.
6. Explain the principles of flow measurement by Pitot tube, variable are meters, weirs and flumes, and magnetic flow meters; and identify appro priate applications.
7. Select and apply a variety of level measuring devices and electronic sensors.
8. Perform calculations and describe process control applications of temperature measurement and resistance thermometry.
9. Explain the operation of an on-off control loop with reference to a simple liquid level system.
10. Describe the hardware used in pneumatic to electric and electric to pneumatic switching.
11. Describe the general characteristics and operation of the proportional control mode.
12. Define the purpose of and explain the operation of a control valve, identify control valve components, and select and specify control valves for various processes.

OBJECTIVES Coftt'd

13. Describe the basic construction of a butterfly valve and its torque characteristics, determine sizing coefficients, and explain the rationale for the selection of a butterfly valve as a final control element.

14. Explain the operation of and demonstrate the characteristics of a ball valve.

15. Differentiate among actuators according to input signal, force, stroke and output increment; and summarize the guidelines for the selection and specification of control valve actuators.

16. Calculate the delivery rate for a given belt feeder and explain methods of control of a metering pump.

17. Describe process control computer systems, the use of microcomputers in process control loops, and process control methods which may be applied to digital process control.