SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, **ONTARIO**

COURSE OUTLINE

COURSE TITLE: PROCESS CONTROL

CODE NO. PPE 344-5 **SEMESTER:** V

PROGRAM: PULP & PAPER/WATER RESOURCES ENGINEERING TECHNOLOGY

AUTHOR: JOHN K. THEIL

DATE: SEPTEMBER 1989 **PREVIOUS OUTLINE DATED:** OCTOBER 1988

APPROVED: *SS7TS S/fc^-*
CHAIRPERSON **DATE** *f*

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COURSE NAME **CODE NO.**

TOTAL CREDIT HOURS: 60

PREREQUISITES): HYD220 HYDRAULICS

I. 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, controllers, and final control elements.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will be able to:

1. Describe applications of process 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, and to use these concepts in appropriate applications.
4. Identify the characteristics and applications of various pressure measuring elements.
5. Select and apply a variety of pressure and level measuring devices.
6. Describe the function of a transmitter.
7. Describe the hardware used in pneumatic to electric and electric to pneumatic switching.
8. Explain the operation of an on-off control loop.
9. Describe the general characteristics and operation of the proportional control mode.
10. 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.

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III. TOPICS TO BE **COVERED:**

	TOPICS	HOURS
1.	Process Control Applications	3
2.	Control Loop Components	3
3.	Open and Closed Loop Control	2
4.	Principles and Applications of Hydrostatics and Fluid Mechanics	
5.	Characteristics and Applications of Pressure and Level Measuring Devices	
6.	Transmitter Function and Input/Output Calculations	2
7.	Pneumatic/Electric Switching Hardware	1
8.	On/Off Control	5
9.	Proportional Control	6
10.	Control Valve Characteristics and Applications.	
		31
	Laboratory Exercises	20
	Interim Tests/Final Examination	6
	Review	3

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IV. METHOD OF ASSESSMENT:

Assignments/Laboratory Exercises	30%
Interim Tests 2 @ 20%	40%
Final Examination	30%

GRADING

A+	90-100%
A	80-89%
B	70-79%
C	60-69%

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.

V. REQUIRED STUDENT RESOURCES:

Process Measurement Fundamentals, Vol. 1; by T.E. Collis, E.M. Eacho, J.P. Jerald, and M.K. Reardon; General Physics Corporation.

Process Control Fundamentals; by Quintech Division of Lab-Volt.

VI. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY **BOOK SECTION:**

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

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.