

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

COURSE OUTLINE

Course Title: ENGINEERING SCIENCE

Code No.: ELR 105-3

Program: ELECTRICAL/ELECTRONICS

Semester: ONE

Date: AUGUST, 1986

Author: R. HEATH

New: X Revisi

APPROVED:

J.P. Crozitto  
Chairperson

Date

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ELR-105 ENGINEERING SCIENCE

COURSE OUTLINE

TEXT MATERIAL

- R. E. Heath - NME-4C Coherent Units of Measurement - 1986
- T. E. Collis et al - Process Measurement Fundamentals - General Physics Corporation 1981

REFERENCE TEXT

- David A. Bell - Fundamentals of Electric Circuits, 3rd Edition - Reston 1984

COURSE TOPICS

1.(a) COHERENT UNITS OF MEASUREMENT

- Unit Systems
- Coherent Units
- Base Units
- Supplementary Units
- Dimensionless Quantities
- Mass and Weight and the Difference Between Them
- Frequency and Period
- Quantity and Unit Symbols
- SI Prefixes
- Substitution of Values into Equations
- Electrical Quantities and Units
- Characteristics and Consequences of a Coherent Unit System
- Conversion Factors

1.(b) MEASUREMENT TECHNIQUES, TERMINOLOGY AND CHARACTERISTICS

- Basic Instrument Channel
- Direct vs. Inferred Measurement

## Process Measurement Terminology

Static Characteristics

Dynamic Characteristics

## 2. PRESSURE MEASUREMENT

Hydrostatic Pressure

Pressure from Mechanical Force

Pressure from Heat

Manometer

Diaphragm Pressure Devices

Pressure Capsules

Bellows Pressure Devices

Diaphragm Seals

Pulsation Dampers

Pressure Sensor Positioning

## 3. TEMPERATURE MEASUREMENT

Liquid-in-Glass Thermometers

Filled System Thermometers

Bimetallic Strip Thermometers

Thermocouple Theory

Thermoelectric Power

Thermocouple Metals

Thermocouple Laws

Thermocouple Tables

Thermocouple Construction

Thermocouple Testing

Thermocouple Measuring Circuits

Resistance Temperature Detector, RTD

RTD Construction

Comparison with other Sensors

Resistance Temperature Detector Measuring Circuits

Thermistors

Thermistor Construction

Thermistor Application

4. FLOW MEASUREMENT

Units of Flow

Flowmeters

Properties of Fluids

Flow Characteristics

Continuity of Flow

Bernoulli's Equation

Head Flowmeters

Primary Elements

The Pitot Tube

Magnetic Flowmeters

Rotameters

5. LEVEL MEASUREMENT

Gauge Glass

Ball Float

Chain Float

Hydrostatic Head Pressure Detectors

All of the text material, under the topic headings listed above, will not necessarily be covered, or may be only briefly covered. Further, limited coverage of a few other topics may occur as ongoing circumstances require.

REH 1986 June