

# STEAM ENGINEERING INSTITUTE

## CONTINUING EDUCATION PROGRAM

Course:	Instrumentation
Continuing Education Hours:	26
Textbook:	“Instrumentation” Fourth Edition by Franklyn W. Kirk, Thomas A. Weedon and Philip Kirk. Published by American Technical Publishers, 2005; ISBN 0-8269-3423-4
Workbook	“Instrumentation Workbook” Fourth Edition; Published by the American Technical Publishers, 2005; ISBN 0-8269-3424-2
Assignment:	<p><b>Follow student study guidelines.</b> Answer the questions in at the end of each lesson in student’s workbook. <b>At the end of your course send in all of your assignments to your instructor for review.</b></p> <p>You will be notified of where and when to appear for your final examination. <b>Photo identification is required at final examination.</b></p> <p><b>PUT YOUR NAME AND DATE ON EACH ASSIGNMENT</b></p> <p><b>Course will concentrate on INSTRUMENTATION as it applies to high pressure steam plants.</b></p>

### Lesson 1

#### **Introduction to Instrumentation**

Instrumentation; fundamentals of process control; piping and instrument diagrams; industry and standards organizations.

### Lesson 2

#### **Temperature**

Temperature, heat and energy; thermal expansion and thermometers; electrical thermometers; infrared radiation thermometers; heat sensing materials; calibration.

### Lesson 3

#### **Pressure**

Pressure; pressure instruments; pressure measurement applications.

### Lesson 4

#### **Level**

Level; mechanical instruments; electrical instruments; ultrasonic, radar and laser instruments; weigh systems; level measurement applications.

### Lesson 5

#### **Flow**

Fluid flow; differential pressure flow meters; variable-area flow meters; mechanical flow meters; electrical flow meters; mass flow meters; open-channel flow meters; solids flow meters.

### Lesson 6

#### **Analysis**

Analysis; gas analysis; humidity analyzers; solids moisture analyzers; liquid analyzers; electrochemical analyzers; composition analyzers; analyzer applications.

### Lesson 7

#### **Transmission and Communication**

Transmission signals; digital numbering systems and codes; digital communications

### Lesson 8

#### **Automatic Control**

Automatic control; process dynamics; control functions; control strategies; control tuning; digital controllers; pneumatic controllers; electric controllers; operator interfaces; configuration formats; advanced control strategies.

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Lesson 9

## **Final Elements**

Final elements; control valves; regulators; dampers; actuators and positioners;  
ON/OFF control actions; variable speed drives; electric power controllers.

Lesson 10

## **Safety Systems**

Safety systems; individual safety devices; electrical safety standards; safety instrumented systems;  
industrial switches and sensors.

Lesson 11

## **Applications**

Instrument applications; general techniques; temperature; pressure; level; flow; analysis;  
multivariable.

Appendices

## **Principles of Electricity**

## **Instrument Tables**

## **CD-Rom Contents**

Using the CD Rom- Media Clips-Quick Quizzes-Instrument Resources-Illustrated Glossary-Reference Material.

**This course will offer 26 hours of credit for license renewal. An additional four-hour course on MGL Chapter 146 and 522CMR is required to receive a thirty-hour certificate for license renewal which is included in the cost of this course.**