



INSTRUMENTATION & CONTROL

This training course has been developed by OakCAD/NCT to meet the growing need for technician engineers to update or upgrade their knowledge and skills in instrumentation and control.

The course content has been developed in consultation with several of our large pharmaceutical and manufacturing clients over many years and is a unit from our **Certificate in Engineering Maintenance**.

The course has been endorsed under the ABC Awards/Certa Quality Licence Scheme. This means that OakCAD/NCT has undergone an external quality check to ensure that the organisation and the courses it offers, meets defined quality criteria.

At the end of this course successful learners will receive a Certificate of Achievement from ABC Awards/Certa and a Learner Unit Summary (which lists the components the learner has completed as part of the course).

This course is in modular form with each module individually assessed and can be provided as a tutor lead delivered course, as a distance learning course or flexibly, combining both methods.

It consists of:

- 1 Course notes
- 2 Worked examples
- 3 Trainee self-assessments
- 4 Module assessments

On completion of all modules, there is an end of course and practical assessment.

Companies who are considering the development of their own Apprenticeship Scheme may wish to include this course into their plans.

If required OakCAD/NCT can also help develop an effective company scheme.

STUDY TIME

This course has been set at a level equivalent to Level 3 and it is expected that it will take you 20 - 30 hours of delivered time or approximately 60 hours of self-study time (distance learning).

COURSE FEE

The current level of course fees for distance learning courses is displayed on the NCT web site.

For delivered courses, please contact OakCAD/NCT.

REQUIREMENTS

To undertake this course, you should have good basic engineering and mathematical knowledge. OakCAD/NCT is able to advise you as to whether you have the necessary background knowledge and experience to undertake this course.

INDUSTRY

Although written for the pharmaceutical industry it is also appropriate for the Petro- chemical industry, Food Manufacture or any industry using automatic production lines and processes or having a modern maintenance requirement.



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- Module 1 Measurement & Performance**
- 1 Measuring Systems
 - 2 Performance
 - 3 Errors
- Module 2 Units & Standards**
- 1 SI Units
 - 2 Primary Standards
 - 3 Derived Units
 - 4 Standards & Calibration
- Module 3 Signal Conditioning**
- 1 Signal Conditioning
 - 2 Amplifiers
 - 3 Wheatstone Bridge
 - 4 Potentiometers
 - 5 Analogue to Digital Conversion and Digital to Analogue Conversion
- Module 4 Transmission**
- 1 Electrical Signals
 - 2 Pneumatic Signals
- Module 5 Temperature Measurement**
- 1 Temperature Scales
 - 2 International Practical Temperature Scale
 - 3 Sensors
 - i. Bimetallic Strip
 - ii. Filled Systems
 - iii. Thermistors
 - iv. Resistance Thermometers
 - v. Thermocouples
- Module 6 Pressure Measurement**
- 1 Units of Pressure
 - 2 Pressure Scales
 - 3 Sensors
 - i. Manometers
 - ii. Diaphragms
 - iii. Capsules
 - iv. Bellows
 - v. Bourdon Tube
 - vi Pressure Transducers

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- Module 7 Flow Measurement**
- 1 Units of Flow
 - 2 Quantity of Flow
 - 3 Flow Rate
 - 4 Flow Measurement Devices
- Module 8 Strain Gauge Transducers**
- 1 Strain Gauge Principles
 - 2 Signal Conditioning
 - 3 Transducers
 - i. Load Cells
 - ii. Cantilever Devices
 - iii. Accelerometers
- Module 9 Humidity Measurement**
- 1 Understanding Humidity
 - 2 Absolute Humidity
 - 3 Specific & Relative Humidity
 - 4 Dew & Frost Points
 - 5 Sensors
 - i Chilled Mirror Hygrometer
 - ii Relative Humidity Sensors
 - iii Wet & Dry Bulb
 - iv Psychometric Charts
- Module 10 Positional Sensors**
- 1 Positional Requirements
 - 2 Sensors
 - i Photoelectric
 - ii Capacitive
 - iii Inductive
 - iv Ultrasonic
 - v Applications
- Module 11 Process Control**
- 1 Open & Closed Loop Systems
 - 2 Measurement & Control System
 - 3 Control Definitions
 - 4 Process Response & Time Constant
 - 6 Control Modes
 - 7 Actuators