

PLC PRINCIPLES

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

This is a unit from our **Certificate in Engineering Maintenance**. The units and the complete qualification are certificated by **EAL**, as a Certificate of Verified Achievement, and have achieved the Quality Award from **unionlearn**.

EAL (Excellence, Achievement & Learning Limited) is a major UK engineering awarding body and the **unionlearn** Quality Award is developmental and aims to support providers to reach the highest possible standards of working with the unions.

The course content has been developed in consultation with several of our large pharmaceutical and manufacturing clients over many years and can be provided as a tutor lead delivered course, as a distance learning course or flexibly, combining both methods.

This course is in modular form with each module individually assessed and 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 EAL accredited & certificated qualification into their plans.

If required OakCAD 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.

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.

PLC PRINCIPLES

1. Introduction to Programmable Logic Controllers

- 1.1 Overview
- 1.2 Programming – Formats and options
- 1.3 Hardware –Types and formats
- 1.4 PLC Functionality

2. Designing the control system, specifying and selecting the PLC

Getting started

- 2.1 Specification, User Requirement Specification and Functional Design Specification.
- 2.2 Example URS
- 2.3 Example FDS
- 2.4 Summary

Selection

- 2.5 Selecting the PLC for the application – selection criteria.
- 2.6 Control functions outside the PLC.
- 2.7 Specify the PLC hardware.
- 2.8 Selection criteria.
 - 2.8.1 I/O
 - 2.8.2 CPU
 - 2.8.3 Special Features
 - 2.8.4 Future Expansion
 - 2.8.5 Programming tools.
 - 2.8.6 Price.

3. Inside your PLC

4. Terminology

5. Introduction to Programming

- 5.1 Loading the software
- 5.2 Starting the software
- 5.3 How to open a PLC Project
- 5.4 Ladder diagrams
- 5.5 Writing a Simple Programme
- 5.6 Set up communications for program download
 - 3.6.1 Baud rate
 - 3.6.2 Data bits
 - 3.6.3 Parity
 - 3.6.4 Stop bits
- 5.7 Testing the program

6. Number Systems

- 6.1 Decimal
- 6.2 Binary
- 6.3 Hexadecimal

7. Addressing

- 7.1 Words and Bits
- 7.2 Addressing for PLC I/O
- 7.3 Other PLC Addresses

8. Basic Programming Functions

- 8.1 Timers and Counters
- 8.2 Keep, Set and Reset
- 8.3 @, Inc, DIFU, DIFD
- 8.4 Move Function
- 8.5 Shift Register

9. Developing Good Programming Practices

- 9.1 Documenting Your Program
- 9.2 Saving Files and Version Numbers

10. Inputs & Outputs

- 10.1 Connecting Inputs
- 10.2 Connecting Outputs