Module Specification

Programmable Logic Controller Design

Version: 2023-24, v2.0, 15 Mar 2023

Contents

Part 1: Information

Module title: Programmable Logic Controller Design

Module code: UFMFHM-15-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: Digital Principles for Robotics 2023-24, Electrical and Electronic Principles B 2023-24, Practical Electronics 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module is designed to introduce students to the basic working principles of Programmable Logic Controller (PLC), construction, functions of input and output with the aim of creating a sound fundamental knowledge of designing and operating engineering systems.

Features: Not applicable

Educational aims: In addition to the learning outcomes. the educational experience may develop through practice but not formally discretely assess self-management skills and working with others.

Outline syllabus: The students will learn to model and analyse the performance of real-world engineering systems using a series of lectures, tutorials and simulation based laboratory work. The module also involves studying relevant literature on environmental and sustainability limits, ethical, health, safety, security and risk issues, and code of practice and standards issues. The syllabus outline includes design, structure and operation of PLC: working principles, characteristics, function of each section of PLC, operational procedure of PLC. Ladder Programming: covers all functions and operational procedures and examples covering variety of applications such as start/stop motor control, motor speed control, moving a pneumatic piston, counting and balancing, pick and place unit and control of robots and work cells. PLC interfacing digital and analogue devices and communication aspects of PLC.

Part 3: Teaching and learning methods

Teaching and learning methods: Concepts and the scope of the syllabus topics will be introduced in lectures, supported by directed reading and lab experiments/simulation based work. The labs sessions will enhance the understanding of students of real-world applications of the material delivered in the module. The students will learn through applying a variety of analysis methods, ladder programming and simulation tools to design PLC systems.

Relevant ethical issues will be highlighted and students will be encouraged to consider these further through directed reading.

In addition to 36 hours of scheduled contact, students will be expected to spend (typically) 92 hours in independent study, preparation for classes, assimilation of knowledge and skills development. The assessment strategy involving submitting a research based assignment and end of module examination will require (typically) 22

hours.

Scheduled learning includes lecture and tutorials/practical classes.

Independent learning includes hours engaged with essential reading, assignment preparation and completion etc. These sessions constitute an average time per level.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Apply concepts and working principles of programmable logic controller (PLC) used in advance engineering processes

MO2 Apply engineering and scientific principles of other disciplines to support real-world implementation of PLC

MO3 Identify, classify and describe the performance of systems containing PLCs through the use of ladder programming techniques

MO4 Investigate and design engineering application with PLC by identifying constraints including environmental and sustainability limits, ethical, health, safety, security and risk issues, and code of practice and standards

MO5 Identify the commercial and economic and social context of engineering applications that integrate PLC systems

MO6 Apply quality standards to the design of systems containing PLCs

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/index.html

Part 4: Assessment

Assessment strategy: The assessment consists of an end of module examination and an individual assignment.

The strategy has been chosen to ensure that the engineering principles are assessed under controlled conditions, while a more open ended research based assignment is used to encourage wider engagement and reflection on this topic.

Assessment tasks:

Examination (First Sit)
Description: Examination (2 hours)
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO3, MO5

Report (First Sit)
Description: Report: maximum page limit 15 (excluding appendices and any additional material)
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Examination (Online) (Resit)
Description: Examination (2 hours)
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO3, MO5

Report (Resit)

Description: Report: maximum page limit 15 (excluding appendices and any additional material)
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Automation and Robotics Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2021-22

Automation and Robotics Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Technology (Mechatronics) {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Technology (Mechatronics) {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2021-22