

Liverpool John Moores University

Title: Introduction to Embedded Control
Status: Definitive
Code: **4007ELE** (120114)
Version Start Date: 01-08-2016

Owning School/Faculty: Electronics and Electrical Engineering
Teaching School/Faculty: Electronics and Electrical Engineering

Team	Leader
Princy Johnson	Y

Academic Level: FHEQ4 **Credit Value:** 20 **Total Delivered Hours:** 74
Total Learning Hours: 200 **Private Study:** 126

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Practical	48

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Exam	70	2
Practice	AS1	Working System	30	

Aims

To gain an understanding of the basic principles and structures of a range of embedded processors and investigate the implementation of a basic application.

Learning Outcomes

After completing the module the student should be able to:

- 1 Describe the architectures of typical microprocessors and microcontrollers.
- 2 Produce a program for an Embedded Processor to implement a simple system and demonstrate.
- 3 Design simple circuits that incorporate embedded processor to solve a simple task.
- 4 Describe the use of Embedded Processors including their wireless applications in current technology context.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	3	4
Working System	2		

Outline Syllabus

Microprocessors and Microcontroller architectures and design: Princeton and Harvard architectures; pipelining; hazards in using pipelining and mitigation; Reduced Instruction Set Computing (RISC) and Complex Instruction Set Computing (CISC) in processor designs for Microcontrollers and microprocessors.

Programming microcontrollers to complete basic automated tasks: Flowcode, and introduction to Assembly and Embedded C programming; Use of macros; use of Timer interrupts; planning and design of flowchart or pseudo code; writing program and execution to complete a set of automation tasks; troubleshooting.

Data transfer techniques for interfacing with peripheral devices: parallel and serial data transfer techniques; types of interfacing between processor and peripheral devices; planning and design of an example interfacing problem.

Current Industrial and non-Industrial applications that incorporate embedded processors; Microcontrollers in Wireless applications: Introduction to current wireless protocols for microcontrollers; Introduction to web applications using microcontrollers.

Learning Activities

Lecture and demonstration and practical activities applying topics discussed.

Notes

This module introduces the use of embedded processors in modern electronic equipment.