

Liverpool John Moores University

Title: Digital and Embedded Systems

Status: Definitive

Code: **5301CIT** (125301)

Version Start Date: 01-08-2021

Owning School/Faculty: Engineering

Teaching School/Faculty: Changshu Institute of Technology

Team	Leader
Mahamoud Ahmed	Y
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Academic Level:	FHEQ5	Credit Value:	20	Total Delivered Hours:	66
Total Learning Hours:	200	Private Study:	134		

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	48
Practical	16

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Exam	60	2
Report	Prog	Programming	30	
Essay	Coursework	Coursework	10	

Aims

This module is intended to enhance knowledge and understanding of digital circuit design and finite state machines. It's also intended to develop further understanding of modern microcontroller architectures and interfaces requirements to external systems. It aims to provide students with practical skills to design, analyze embedded systems with various external sensors and actuators.

Learning Outcomes

After completing the module the student should be able to:

- 1 Analyse electronic circuit operation functions and design the special circuit modules.
- 2 Design, analyse and implement finite state machine in embedded systems.
- 3 Describe and identify suitable interfaces for modern microcontroller/embedded systems, and construct the basic application system.
- 4 Select appropriate hardware, software platforms and interface considering power, cost and capability requirements.
- 5 Design integrated embedded systems with external sensors and actuators.

Learning Outcomes of Assessments

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

Exam	1	2	3	4
Programming	2	4	5	
Coursework	2	4	5	

Outline Syllabus

1. *Further introduction to Boolean algebra and Karnaugh maps.*
2. *Design with synchronous sequential state machine.*
3. *Design with asynchronous sequential state machine.*
4. *Embedded processors and the implementation.*
5. *Power requirements of embedded systems and low-power designs.*
6. *Sensors and Sensor interface.*
7. *Actuators and design of drive circuits for actuators.*

Learning Activities

Lecture, demonstration and practical activities applying topics discussed.

Notes

This module introduces the students to digital electronics and the application of Embedded processors in electrical circuits.