Liverpool John Moores University

Title:	Digital and Embedded Systems
Status:	Definitive
Code:	**5001ELE** (120045)
Version Start Date:	01-08-2019
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Mahamoud Ahmed	Y
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Academic Level:	FHEQ5	**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
Report	Report 1	Digital Systems Assignment	15	
Report	Report 2	Embedded Systems Assignment	15	

Aims

The module aims to broaden the students' knowledge and understanding of digital circuit design, and examines modern microcontroller architectures and the interface requirements to external systems. It also aims to provide students with practical skills necessary to design, analyse and implement electronic circuits controlled by microcontrollers and finite state machines

Learning Outcomes

After completing the module the student should be able to:

1	Define electronic circuit operations and design
2	Design, analyse and implement finite state machine based digital circuits
3	Select appropriate processor considering power, cost and capability requirements
4	Identify the power resources required for embedded systems operation
5	Produce 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
Digital Systems Assignment	1	2		
Embedded Systems Assignment	3	4	5	

Outline Syllabus

Review of Boolean algebra and Karnaugh maps.
Synchronous sequential state machine design and analysis, including Mealy, Moore and mixed type circuits.
Asynchronous sequential design.

Identify the advantages and disadvantages of various processors available on the market.
Research the costs of mass production identifying the power and capability of the devices.
Plan for the power requirements of embedded systems, considering different use case requirements.

Create embedded systems that interface with various sensors, both analogue and digital, ensuring that inputs are buffered to protect the processor for hazardous conditions.

Integrate processors with control devices e.g. Servos, Motors

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.