

**Summary Information**

<b>Module Code</b>	4401ELE
<b>Formal Module Title</b>	Digital Electronics
<b>Owning School</b>	Engineering
<b>Career</b>	Undergraduate
<b>Credits</b>	20
<b>Academic level</b>	FHEQ Level 4
<b>Grading Schema</b>	40

**Module Contacts****Module Leader**

<b>Contact Name</b>	<b>Applies to all offerings</b>	<b>Offerings</b>
Obrad Dordevic	Yes	N/A

**Module Team Member**

<b>Contact Name</b>	<b>Applies to all offerings</b>	<b>Offerings</b>
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**Partner Module Team**

<b>Contact Name</b>	<b>Applies to all offerings</b>	<b>Offerings</b>
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**Teaching Responsibility**

<b>LJMU Schools involved in Delivery</b>
Engineering

**Learning Methods**

<b>Learning Method Type</b>	<b>Hours</b>
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Lecture	11
Practical	22
Tutorial	11

### Module Offering(s)

Offering Code	Location	Start Month	Duration
SEP-CTY	CTY	September	12 Weeks

### Aims and Outcomes

<b>Aims</b>	To provide an introduction to Boolean Logic and the operation of combinational and sequential digital logic circuits.
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### Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Understand the principles of Boolean logic and algorithms.
MLO2	Examine electronics through analysing and designing basic combinational digital circuits.
MLO3	Identify sequential digital circuits and applications.
MLO4	Apply the knowledge in digital electronic circuit design

### Module Content

Outline Syllabus
Logic Gates and Functions, DeMorgan's Theorems and gate equivalence. Combinational Logic and Boolean Algebra' Boolean expression from logic diagrams and truth tables, truth tables from logic diagrams and Boolean expressions, commutative, associative and distributive properties, loading Karnaugh map from a truth table, multiple and overlapping groups. Applications of Karnaugh map: multiple output networks, decoders, code conversion network. Digital logic and combinational circuits Latches and Flip-Flops: SR latch, Latches as contact-bounce eliminators, Edge triggered SR, D-type, J-K Flip-Flops. Digital Counters: asynchronous and synchronous counters concept, Counter design using S-R/JK/D-type flip-flops. Shift Registers: serial shift registers, serial in-parallel out shift registers, bidirectional shift registers. Sequential circuits design. Use CAD tools to carry out circuit design and simulation.

### Module Overview

## Additional Information

This Level 4 module is devised for students to gain fundamental knowledge and practical skills in digital electronics circuit analysis and design. General Notes UNESCO Sustainable Development Goals Quality Education Gender Equality Industry, Innovation and Infrastructure Sustainable Cities and Communities Climate Action Partnerships for the Goals UK SPEC AHEP 4C Eng. M8 Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct. M11 Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. M13 Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations. IEng.B1 Apply knowledge of mathematics, statistics, natural science and engineering principles to broadly-defined problems. Some of the knowledge will be informed by current developments in the subject of study. B2 Analyse broadly-defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles. B3 Select and apply appropriate computational and analytical techniques to model broadly-defined problems, recognising the limitations of the techniques employed. B4 Select and evaluate technical literature and other sources of information to address broadly-defined problems. B5 Design solutions for broadly-defined problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards. B6 Apply an integrated or systems approach to the solution of broadly-defined problems. B12 Use practical laboratory and workshop skills to investigate broadly-defined problems. B13 Select and apply appropriate materials, equipment, engineering technologies and processes.

## Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Centralised Exam	Exam	70	2	MLO3, MLO1, MLO4, MLO2
Portfolio	Portfolio	30	0	MLO3, MLO1, MLO4, MLO2