LIVERPOOL JOHN MOORES UNIVERSITY

# Module Proforma

**Approved, 2022.02**

## Summary Information

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|---|---|
| **Module Code** | 6406ELE |
| **Formal Module Title** | Further Electronic Design |
| **Owning School** | Engineering |
| **Career** | Undergraduate |
| **Credits** | 20 |
| **Academic level** | FHEQ Level 6 |
| **Grading Schema** | 40 |

## Module Contacts

### Module Leader

| Contact Name | Applies to all offerings | Offerings |
|---|---|---|
| Weidong Zhang | Yes | N/A |

### Module Team Member

| Contact Name | Applies to all offerings | Offerings |
|---|---|---|

### Partner Module Team

| Contact Name | Applies to all offerings | Offerings |
|---|---|---|

## Teaching Responsibility

| LJMU Schools involved in Delivery |
|---|
| Engineering |

## Learning Methods

| Learning Method Type | Hours |
|---|---|

| | |
|---|---|
| Lecture | 11 |
| Practical | 22 |
| Tutorial | 11 |

## Module Offering(s)

| Offering Code | Location | Start Month | Duration |
|---|---|---|---|
| JAN-CTY | CTY | January | 12 Weeks |

## Aims and Outcomes

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| **Aims** | This module is intended to provide students with a good appreciation of the mathematical concepts necessary to apply digital signal and image processing algorithms to a range of engineering problems. |

## Learning Outcomes

**After completing the module the student should be able to:**

| Code | Description |
|---|---|
| MLO1 | Evaluate digital system design using FSMs. |
| MLO2 | Create programmable logic based systems using VHDL. |
| MLO3 | Design and implement microprocessor based systems. |
| MLO4 | Analyse peripheral components for digital and analogue systems. |

## Module Content

| Outline Syllabus |
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| Design FSM using reconfigurable systems. Combinational, synchronous and asynchronous sequential design in programmable logic. Considerations for highspeed systems, metastability and clock distribution, transmission line considerations.Input and output options. Hardware Descriptor Language (HDL) programming. Design of FPGA circuit using VHDL.Design and implementation of digital systems with microcontrollers.JTAG development and debugging environments. |

**Module Overview**

**Additional Information**

General NotesThis Level 6 module will provide students with further skills to design and electronic circuity in practical applications.UNESCO Sustainable Development GoalsQuality EducationPartnerships for the GoalsUK SPEC AHEP 4CEng. M1 Apply a comprehensive knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider context of engineering.M2 Formulate and analyse complex problems to reach substantiated conclusions. This will involve evaluating available data using first principles of mathematics, statistics, natural science and engineering principles, and using engineering judgment to work with information that may be uncertain or incomplete, discussing the limitations of the techniques employed.M3 Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed.M4 Select and critically evaluate technical literature and other sources of information to solve complex problems.M5 Design solutions for complex problems that evidence some originality and 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 standardsM6 Apply an integrated or systems approach to the solution of complex problems.M7 Evaluate the environmental and societal impact of solutions to complex problems (to include the entire lifecycle of a product or process) and minimise adverse impacts.M8 Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.M10 Adopt a holistic and proportionate approach to the mitigation of security risks.M11 Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.M12 Use practical laboratory and workshop skills to investigate complex problems.M13 Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.M14 Discuss the role of quality management systems and continuous improvement in the context of complex problems.IEng.B1 Apply knowledge of mathematics, statistics, natural science and engineeringprinciples 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.B7 Evaluate the environmental and societal impact of solutions to broadly-defined problems.B8 Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.B10 Adopt a holistic and proportionate approach to the mitigation of security risksB11 Recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.B12 Use practical laboratory and

## Assessments

| Assignment Category | Assessment Name | Weight | Exam/Test Length (hours) | Learning Outcome Mapping |
|---|---|---|---|---|
| Portfolio | Report | 100 | 0 | MLO1, MLO4, MLO3, MLO2 |