Module Definition Form (MDF)

Module code: MOD007952	**Version:** 4 **Date Amended:** 03/Jul/2024

1. Module Title
Electronic and Electrical System Design Project

2a. Module Leader
Kahtan Aziz

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
6

3b. Module Type
Project or dissertation (fine graded)

4a. Credits
60

4b. Study Hours
600

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisite:	MOD004430	Embedded Systems	Compulsory
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:			

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

On successful completion of this module, you will be able to conceive, plan, develop and execute a successful real-world electronics and robotics engineering project. You will also produce and present a project report outlining and reflecting on the outcomes of each of the project processes and stages. As a result, you will develop skills such as critical thinking, analysis, reasoning, interpretation, decision-making, information literacy, and information and communication technology, and skills in professional and confident self-presentation.

This is a multidisciplinary module; therefore, projects will include a combination of skills relevant to robotics, electronic and electrical systems, mechatronics, and renewable energy systems. The aim of the project is to integrate your learning in a real-world industrial project and therefore improve your employability skills. The module includes advanced topics in programming, machine learning and AI, hardware and software development, connectivity, and data communications.

This unit introduces you to the techniques and best practices required to successfully create and manage an engineering project designed to identify a solution to an engineering need. Among the topics covered in this unit are roles, responsibilities, and behaviours of a professional engineer, planning a project, project management stages, devising solutions, theories and calculations, management using a Gantt chart, evaluation techniques, communication skills, and the creation and presentation of a project report.

6b. Outline Content

- Project planning and management
- Engineering ethical, legal, professional, and societal responsibilities
- Technical communication skills
- Digital signal processing
- Autonomous systems
- Advanced C/C++ programming
- FPGA Technology Overview
- FPGA Architecture
- Hardware Description Languages (Verilog and VHDL)
- Overview of the FPGA Design Process
- FPGA Development Tools
- Artificial Intelligence and Robotic
- Embedded Systems Integration
- Internet of things (IOT)
- Design, testing and debugging

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources
Laboratories, computers, hardware, MX30 IOT Boards, Microchip MPLAB X software, test equipment, presentation media, etc., as appropriate.

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Select and apply appropriate computational and analytical techniques to model complex problems in electronic and electrical engineering, recognizing the limitations of the techniques.
2	Knowledge and Understanding	Discuss the role of quality management systems and continuous improvement in the context of complex problems.
3	Knowledge and Understanding	Apply an integrated or systems approach, select and apply appropriate materials, equipment, engineering technologies and processes in an electrical and electronic project, recognizing their limitations.
4	Intellectual, practical, affective and transferrable skills	Manage a project and use a risk management process to identify, evaluate and mitigate risks associated with the project or activity.
5	Intellectual, practical, affective and transferrable skills	Adopt a holistic and proportionate approach to the mitigation of security risks in an electronic and electrical project.
6	Intellectual, practical, affective and transferrable skills	Function effectively as an individual, and as a member or leader of a team; Communicate effectively on engineering matters with technical and non-technical audience

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	72	1-6	3 hour per week for 24 weeks
Other teacher managed learning	72	1-6	3 hour per week for 24 weeks
Student managed learning	456	1-6	Self-directed learning
TOTAL:	600		

9. Assessment for the above Module Occurrence

The assessment for some modules includes a presentation (see below for details on how this particular module is assessed). We recognise that presenting, especially to a large group, can cause significant anxiety or distress for some students. If this may affect you, please contact your Module Leader or the Disability and Neurodiversity Service as early as possible. We will work with you to consider appropriate reasonable adjustments. Depending on your individual needs, these might include, for example, presenting to a smaller group or presenting only to a member of academic staff.

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	1-6	50 (%)	Fine Grade	30 (%)

Group physical products and individual report Component 1, 1500 words – project Planning and report of the plan Group) Individual Report, Project planning and report of the plan maps to Engineering Council Learning Outcome C3,C4,C9, C10 Component 2, 1500 words Physical product and individual Report maps to Engineering Council Learning Outcomes C6, C12, C13

Assessment components for Element 010				
Component No.	**Assessment Title**	**Submission Method**	**Weighting (%)**	**Components needed for Mark Calculation?**
010/1	Individual Report, 1500 words	Canvas	50 (%)	All
010/2	Physical product and Individual Report (1500 words)	Canvas	50 (%)	

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
011	Coursework	2,3	30 (%)	Fine Grade	30 (%)
In-class test, 1.5 hrs, equivalent to 1500 words, maps to Engineering Council LO C1, C2, C3,					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
012	Practical	1-6	20 (%)	Fine Grade	30 (%)
Group Viva including oral presentation, equivalent of 2000 words, maps to Engineering Council LO C16,C17.					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]