Module Proforma

Approved, 2022.01

Summary Information

Module Code	4522USST
Formal Module Title	Software Development for Embedded Systems
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 4
Grading Schema	40

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Dante Matellini	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
LJMU Partner Taught

Partner Teaching Institution

Institution Name
University of Shanghai For Science and Technology

Learning Methods

Learning Method Type	Hours
Practical	33
Tutorial	11

Module Offering(s)

Offering Code	Location	Start Month	Duration
JAN-PAR	PAR	January	12 Weeks

Aims and Outcomes

Aims	Provide an overview of the operation of modern microprocessors/microcontrollers and the mechanisms used to represent and process information. Design and implement applications written in both low level and high level languages.

Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Describe the techniques applied to represent information within a Microprocessor. Describe the instruction set of a computer contrasting RISC and CISC approaches
MLO2	Identify the fundamental components of an embedded processor. Demonstrate an understanding of the software used to drive an Embedded system.
MLO3	Describe the role of modern Operating Systems in embedded, mobile, desktop and server environments.
MLO4	Specify and design embedded applications, then implement them utilising high or low level languages

Module Content

Outline Syllabus
Binary, HEX, 2s Complement, Number endianness, IEEE 754, ASCII, UNICODE. Processor core and cache hierarchies, Buses, Memory Organisation. Application Scheduling, Security, Interrupt Handling, Libraries, Communications. Variables, Arrays, Iteration, Selection, Interaction with I/O, Structures, Flow charts.

Module Overview

Additional Information

This module introduces the fundamentals of embedded systems architecture and the development of high level software.

General Notes

UNESCO Sustainable Development Goals

Good Health and Wellbeing
Quality Education
Gender Equality
Affordable and Clean Energy
Decent Work and Economic Growth
Industry, Innovation and Infrastructure
Reduced Inequalities
Sustainable Cities and Communities

UK SPEC AHEP 4

CEng.
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.
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.
M6 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.
M9 Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity.
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.
M16 Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance.
M17 Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.

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.
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.
B9 Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity
B10 Adopt a holistic and proportionate approach to the mitigation of security risks
B11 Recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.
B12 Use practical laboratory and workshop skills to investigate broadly-defined problems.
B13 Select and apply appropriate materials, equipment, engineering technologies and processes.
B16 Function effectively as an individual, and as a member or leader of a team.
B17 Communicate effectively with technical and non-technical audiences.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Exam	Exam	60	2	MLO1, MLO2, MLO3, MLO4
Report	Report	40	0	MLO1, MLO2, MLO4