

Liverpool John Moores University

Title: DISTRIBUTED AND EMBEDDED SYSTEMS
Status: Definitive
Code: **6013DACOMP** (125373)
Version Start Date: 01-08-2021

Owning School/Faculty: Computer Science and Mathematics
Teaching School/Faculty: Computer Science and Mathematics

Team	Leader
David Lamb	Y

Academic Level: FHEQ6
Credit Value: 20
Total Delivered Hours: 57
Total Learning Hours: 200
Private Study: 143

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	33
Practical	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Artefacts	AS1	A distributed software system	50	
Exam	AS2	Examination	50	2

Aims

To provide an overview of designing and engineering distributed computing systems with references to architectures, communication and synchronisation, with the practical focus on distributed embedded systems.

Learning Outcomes

After completing the module the student should be able to:

- 1 Survey technologies and methods used in distributed systems
- 2 Solve execution issues intrinsic to distributed and embedded systems
- 3 Appraise communications standards and techniques used in embedded systems
- 4 Critically evaluate operational issues in embedded and distributed systems

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Distributed software	1	2
Examination	3	4

Outline Syllabus

Monolithic vs Distributed Systems

Distribution vs Parallelisation

-Message Passing and Shared Memory

Concurrency and Scheduling in Distributed and Embedded Systems

-Liveness, Races and Deadlocks

-Ensuring deterministic behaviour

-Shared resource access; synchronisation, mutual exclusion, atomicity

System architecture for embedded systems

-Microprocessor (modified) Harvard vs. Von Neumann architectures

-Programmable Controllers

-Watchdogs

-Memory and memory units (EPROM, EEPROM, RAM, FLASH)

Software architectures for embedded systems

-Superloop

-RTOS; micro and monolithic kernel architectures

-Managing I/O and interrupts

Communications standards used in embedded systems

-Shared medium/bus systems

-Dedicated line, clock synchronisation, A/D conversion

-Deterministic arbitration and access protocols

Learning Activities

Students will participate in lectures, tutorials, and practical lab sessions. This module will have online practical.

Notes

A practical software engineering course on developing for distributed and embedded systems