

Liverpool John Moores University

Title: Advanced & Embedded Sensors
Status: Definitive
Code: **6171CSD** (125575)
Version Start Date: 01-08-2021

Owning School/Faculty: Engineering
Teaching School/Faculty: Engineering

Team	Leader
Colin Wright	Y

Academic Level: FHEQ6
Credit Value: 20
Total Delivered Hours: 55
Total Learning Hours: 200
Private Study: 145

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Practical	22
Tutorial	11

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	ASS 1	2,500 word report	70	
Technology	ASS 2	2,000 word lab report	30	

Aims

This module will build on the technologies that have been examined to date, to explore how developments in sensing systems are leading to advanced systems with extremely high levels of functionality and embedded sensors of increasing complexity. This module will look at the most advanced systems currently available and how they are driving the market.

Learning Outcomes

After completing the module the student should be able to:

- 1 Analyse a system and choose suitable embedded sensor technologies to measure selected parameter(s).
- 2 Design and build an embedded sensor system to make the required measurements.
- 3 Remotely monitor and display data measurements.

Learning Outcomes of Assessments

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

Report	1	2	3
Lab	1	2	3

Outline Syllabus

Embedded sensor technology and applications
Additive manufacturing and sensor integration
Advanced sensors
Networking
Wireless sensor networks
Microcontroller programming
SPI and I2C interfaces
SoC Microcontrollers with Wifi
Browser based instrumentation using Node-red/Dashboards
Power use minimization
Use of local and cloud based message servers
Lightweight messaging protocols

Learning Activities

A series of structured lectures, tutorials and practical tasks will provide a varied range of learning activities.

Notes

After completion of this module the student will be able to integrate embedded sensors into manufactured objects to aid the design of IoT and remote monitoring systems.