

Liverpool John Moores University

Title: Sensor Technology
Status: Definitive
Code: **5172CSD** (125570)
Version Start Date: 01-08-2021

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

Team	Leader
Muhammad Ateeq	Y

Academic Level: FHEQ5 **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

Mobile devices rely on a whole range of sensing technologies to provide the raft of functionality we now expect from our smartphones and tablets. Modern devices are packed full of hidden sensors that allow us to use our phones to make purchases, take perfect photographs, change the orientation of the screen and to determine which direction to take with a satnav. This module will help us to understand how these sensors work and how we can use them for the benefit of society.

Learning Outcomes

After completing the module the student should be able to:

- 1 Apply various sensors to a range of applications in smart devices and analyse their operation.
- 2 Analyse the performance parameters of sensors and sensor systems.
- 3 Apply industry standard hardware and software methodologies and tools to design and construct a simple sensor solution to a real-world problem.

Learning Outcomes of Assessments

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

Report	1	2
Lab	3	

Outline Syllabus

Introduction to the fundamentals of sensors, types of sensors used in smart devices across various sectors.

Sensors operational principles, performance parameters (accuracy, precision, repeatability, sensitivity, etc.), how to read data from them.

Discussion of various off-the-shelf sensors such as proximity sensors, pressure sensors, light sensors, gyroscopes, digital compass, temperature sensors, accelerometer, magnetic field sensors used in various smart devices.

Emerging and less common technologies used in smart devices to broaden students understanding of new technologies & their application.

Introduction of placement, interfacing and relevant electronic principles of sensors.

Interfacing and connection of sensor to microcontrollers/PID to operate in smart devices.

Relevant concepts such as signal conditioning in sensor systems.

Communication in sensors (wired, wireless).

Case studies & industrial examples on existing sensors and their applications in smart devices.

Familiarise students with concepts such as connectivity and IoT in sensor systems and smart devices.

Lab-based sensor development related activities using appropriate development tools.

Learning Activities

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

Notes

The module will introduce students to the fundamental concepts on sensors in the context of smart devices and computing. Students will familiarise themselves with relevant industrial smart devices utilising sensors, and, the important concepts surrounding such systems, e.g. the communication, connectivity and operation of these sensors. Examples and case studies will support the delivery of the module to develop students' understanding on the use of sensors within smart devices. The module will follow a practical approach and will provide students with hands on experience of designing and constructing some simple sensors relevant to their area of interest.