

## Sensor Technology

### Module Information

2022.01, Approved

#### Summary Information

Module Code	5172CSD
Formal Module Title	Sensor Technology
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
Grading Schema	40

#### Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

#### Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	22
Tutorial	11

#### Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

#### Aims and Outcomes

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.
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**After completing the module the student should be able to:**

### Learning Outcomes

Code	Number	Description
MLO1	1	Apply various sensors to a range of applications in smart devices and analyse their operation.
MLO2	2	Analyse the performance parameters of sensors and sensor systems.
MLO3	3	Apply industry standard hardware and software methodologies and tools to design and construct a simple sensor solution to a real-world problem.

### Module Content

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.
Module Overview	
Additional Information	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.

### Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Report	70	0	MLO1, MLO2
Centralised Exam	Lab	30	0	MLO3

### Module Contacts

