

## Liverpool John Moores University

Title: CREATING DEVICES  
Status: Definitive  
Code: **4011TECH** (105277)  
Version Start Date: 01-08-2016

Owning School/Faculty: Electronics and Electrical Engineering  
Teaching School/Faculty: Electronics and Electrical Engineering

| Team         | Leader |
|--------------|--------|
| Colin Wright | Y      |

**Academic Level:** FHEQ4      **Credit Value:** 12      **Total Delivered Hours:** 36  
**Total Learning Hours:** 120      **Private Study:** 84

### Delivery Options

Course typically offered: Semester 2

| Component | Contact Hours |
|-----------|---------------|
| Lecture   | 12            |
| Practical | 24            |

**Grading Basis:** 40 %

### Assessment Details

| Category | Short Description | Description                                 | Weighting (%) | Exam Duration |
|----------|-------------------|---|---------------|---------------|
| Essay    | AS1               | Electronic circuit design project           | 25            |               |
| Essay    | AS2               | Printed circuit board construction exercise | 25            |               |
| Essay    | AS3               | PIC programming assignment                  | 25            |               |
| Essay    | AS4               | Mechatronic device project report           | 25            |               |

### Aims

*The aim of this module is to allow students to combine knowledge and understanding with the skills to design and make mechatronic devices.*

## Learning Outcomes

After completing the module the student should be able to:

- 1 design simple electronic circuits with the aid of relevant computer programs.
- 2 build and test simple electronic circuits.
- 3 develop simple PIC control programmes.
- 4 develop and construct simple mechatronic devices.

## Learning Outcomes of Assessments

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

|    |   |
|----|---|
| CW | 1 |
| CW | 2 |
| CW | 3 |
| CW | 4 |

## Outline Syllabus

*Electronic components:*

*Resistors, capacitors, potential dividers; diodes; transistors, relays, input devices: sensors of rotation, pressure, proxy, temperature, light, noise and moisture; switches: micro-switches, reed switches, mercury tilt, reed switches, thermistors, output devices; motors.*

*Electronic circuits:*

*Electronics simulation software; PCB design software; breadboards; vero-boards; circuit construction and soldering; testing and fault finding using associated instrumentation.*

*Programming and control:*

*Solving logic problems; logic gates and truth tables; AND, OR, NAND, NOR, NOT. Computer PIC programming using loops and sub-routines to control PIC's/ Microprocesser.*

## Learning Activities

This module will be delivered within the electronics design laboratory. Practical learning activities will be undertaken to develop the students understanding of electronic circuits and skills needed to develop and construct mechatronic devices. This will be supported by an appropriate lecture programme.

## **Notes**

This module makes extensive use of the Lego Mindstorm mechatronic equipment. Practical sessions and supporting lectures will be held in the mechatronics laboratories. Although this module does not cover common mechanisms, the students are expected to transfer their knowledge of this subject from the ENRCT1003 Classical Design module.