

## Liverpool John Moores University

Title: ELECTRICAL AND ELECTRONIC PRINCIPLES  
Status: Definitive  
Code: **4023TECH** (105415)  
Version Start Date: 01-08-2016

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

Team	Leader
Wei Zhang	Y

**Academic Level:** FHEQ4      **Credit Value:** 24      **Total Delivered Hours:** 96  
**Total Learning Hours:** 240      **Private Study:** 144

### Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Practical	48
Tutorial	24

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	AS1	In Class Test	40	
Essay	AS2	Practical Assignment	40	
Essay	AS3	Assignment	20	

### Aims

*To provide a solid understanding of the concepts upon which electrical & electronics principle are based.*

### Learning Outcomes

After completing the module the student should be able to:

- 1 Describe and solve basic problems using DC & AC circuit principles
- 2 Measure the properties of simple electrical and electronic circuits
- 3 Describe and analyze circuits containing discrete semiconductor devices
- 4 Describe and analyze circuits containing operational amplifiers
- 5 Identify the operation of standard logic gates
- 6 Design using standard logic gates a combinational logic circuit from a Boolean expression and using Karnaugh maps
- 7 Design synchronous sequential circuits using flip-flops

### Learning Outcomes of Assessments

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

CW	1	2	3	4	5	6	7
CW	1	3	4	6	7		
CW	6	7					

### Outline Syllabus

*Basic quantities and SI units*

*Ohms law, series & parallel resistors*

*Simple dc circuit analysis*

*Introduction to capacitance & inductance and usage in electrical circuit (descriptive)*

*Review of complex numbers, Impedance of R,C,L components*

*Resonance, power*

*PN junction diodes. Forward and reverse biasing of a PN junction. Diode applications. Zener diodes. Basic transistor operation. Transistor characteristics and operations, (Biasing and DC load line). Transistor applications. Ideal operational amplifiers, Inverting, non-inverting, summing, integrator and differential amplifiers. Boolean notation and truth tables. Gate networks. DeMorgan's theorem. Boolean Algebra. Karnaugh maps. Sequential logic: SR, JK, D and T type flip-flops. Design a simple counter using SR, JK, D, and T type flip flop.*

### Learning Activities

Lectures, tutorial and practical sessions

### Notes

This module provides a fundamental understanding of electrical & electronic principles for level 1 BSc programmes.