

Liverpool John Moores University

Title: Engineering Principles
Status: Definitive
Code: **4301CIT** (125316)
Version Start Date: 01-08-2020

Owning School/Faculty: Engineering
Teaching School/Faculty: Changshu Institute of Technology

Team	Leader
Rebecca Bartlett	Y
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Academic Level: FHEQ4 **Credit Value:** 20 **Total Delivered Hours:** 82
Total Learning Hours: 200 **Private Study:** 118

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	64
Practical	16

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	60	2
Practice	AS2	Programming	30	
Report	AS3	Report	10	

Aims

This module is intended to provide students with a good appreciation of

- the physical properties and behaviours that influence electrical systems,
- how parameters are measured
- communications systems

Learning Outcomes

After completing the module the student should be able to:

- 1 Describe the relationship between the basic control circuits
- 2 Use circuit analysis technology to set static working point
- 3 Calculate the power in the ac circuit
- 4 Apply plural and phasor to analysis ac circuits

Learning Outcomes of Assessments

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

Exam	1	2	3	4
Programming	1	2	3	4
Report	1	2	3	4

Outline Syllabus

1 Basic concepts and methods

Units

Precision

accuracy

Error analysis

2 Measuring principle and sensor

Heat, temperature

Forces, stress, strain

Gyroscopes, position and orientation

Sensors for mechanical parameters

Measurement systems, transducers and sensors

The effect of the physical environment on electrical systems

3 Frequency domain and time domain

Sine Waves – Frequency, Phase, Amplitude; Time and frequency domain representation;

Spectrum – Bandwidth and Frequency response

Noise and Interference; SNR

Propagation – fibre, copper, radio; Signal Strength; power and energy; dB

4 Basic principles of communication systems

Baseband– binary line coding, detection, timing, differential codes, block codes,

Passband –modulation, AM, FM

Digital and Analogue– comparison, uses, conversion, sampling

5 Basic principles of networks

Network introduction - topologies, connection types, media, synchronous and asynchronous systems, protocols

Learning Activities

A series of lectures with some laboratory activities

Notes

This module will introduce students to fundamental mechanical parameters, their measurement, and their impact on electrical circuits, and the principles behind the communication of data.