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Title: Engineering Principles
Status: Definitive
Code: **4511USST** (126457)
Version Start Date: 01-08-2021

Owning School/Faculty: Engineering
Teaching School/Faculty: University of Shanghai For Science and Technology

Team	Leader
Rebecca Bartlett	Y

Academic Level: FHEQ4 **Credit Value:** 20 **Total Delivered Hours:** 68
Total Learning Hours: 200 **Private Study:** 132

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	44
Tutorial	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Exam	70	2
Test	tests	Online exercises	30	

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 Appraise appropriate sensors and apply basic measurement principles
- 2 Examine basic physical parameters such as heat, temperature, stress and strain and their impact on electrical systems
- 3 Debate the principles of communications systems and networks
- 4 Solve simple problems in communications systems and networks

Learning Outcomes of Assessments

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

Exam	1	2	3	4
Online exercises	1	2	3	4

Outline Syllabus

Units, precision, accuracy

Measurement systems, transducers and sensors

Error analysis

Heat, temperature

Forces, stress, strain

Sensors for mechanical parameters

Gyroscopes, position and orientation

The effect of the physical environment on electrical systems

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

Spectrum – Bandwidth and Frequency response

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

Noise and Interference; SNR

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

Passband –modulation, AM, FM

Digital and Analogue– comparison, uses, conversion, sampling

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

Learning Activities

A series of lectures and tutorials

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.