

Liverpool John Moores University

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Title: Foundation Physics - Mechanics, Materials and Waves
Status: Definitive
Code: **3504USST** (126427)
Version Start Date: 01-08-2021
Owning School/Faculty: Engineering
Teaching School/Faculty: University of Shanghai For Science and Technology

Team	Leader
Martin Sharp	Y

Academic Level: FHEQ3 **Credit Value:** 20 **Total Delivered Hours:** 57
Total Learning Hours: 200 **Private Study:** 143

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	33
Tutorial	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	End of semester examination	50	2
Test	AS2	On-line tests	50	

Aims

The aim of this module is to provide students who may not have studied A-level physics with the prerequisite knowledge regarding mechanics, materials and waves which is required to go on to study for an engineering or technology degree.

Learning Outcomes

After completing the module the student should be able to:

- 1 Apply their knowledge of force, energy and momentum to analyse the behaviour of simple mechanical systems
- 2 Interpret the properties of materials and apply the equations that describe their characteristics.
- 3 Illustrate the general properties of longitudinal and transverse waves in different media, and apply the governing equations to simple applications.
- 4 Employ the principles of thermodynamics and the thermal properties of a simple system. Derive and apply equations which govern these principles.

Learning Outcomes of Assessments

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

End of year examination	1	2	3	4
On-line tests	1	2		

Outline Syllabus

The list below provides an indicative list of topics which may be covered in this module:

Essential Knowledge

- *Base units*
- *SI Units*
- *Prefixes describing size or quantity*
- *Converting between equivalent units*
- *Scalar and vector quantities*
- *Conditions for equilibrium*

Force, Energy and Momentum

- *Newton's laws of motion*
- *Forces and moments*
- *Motion in a straight line*
- *Motion of a projectile*
- *Circular motion*
- *Simple harmonic motion*
- *Momentum*
- *Work, energy and power*

Materials

- *Properties of solid materials*
- *Hooke's law*

- *Young's Modulus*
- *Elasticity, plasticity and fracture*

Waves

- *Longitudinal and transverse waves*
- *Progressive and stationary waves*
- *Refraction and diffraction*
- *Coherence, interference, superposition and phase*

Thermodynamics

- *Thermodynamic laws*
- *Internal energy and enthalpy*
- *Absolute zero and the Kelvin scale*
- *Heat transfer mechanisms*
- *Changes of state*
- *Heat capacity*
- *Ideal gasses*
- *Boyle's law and Charles's law*
- *Molar mass and molecular mass*
- *Brownian motion*

Learning Activities

Lectures and tutorials

Notes

This module looks at the fundamentals of mechanics, materials and waves, using the maths developed during the Foundation Mathematics modules.