

## Liverpool John Moores University

Title: SCIENCE AND MATERIALS  
Status: Definitive  
Code: **4507ICBTBS** (126984)  
Version Start Date: 01-08-2021

Owning School/Faculty: Civil Engineering and Built Environment  
Teaching School/Faculty: ICBT, Colombo

Team	Leader
Alison Cotgrave	Y

**Academic Level:** FHEQ4      **Credit Value:** 15      **Total Delivered Hours:** 60  
**Total Learning Hours:** 150      **Private Study:** 90

### Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	45
Tutorial	15

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Test	AS1	ONLINE MULTI CHOICE TEST	40	1.5
Portfolio	AS2	Detailed Design Documentation And Presentation (2000 words)	60	

### Aims

*Aim of this module is to provide students with an appreciation of the common scientific principles associated with environmental conditions inside buildings, and the properties and behaviour of common building materials.  
To enable students to apply appropriate scientific and analytical methods to investigate the internal environment in buildings and the performance and behaviour of common building materials.*

## Learning Outcomes

After completing the module the student should be able to:

- 1 Apply appropriate scientific and analytical methods to investigate scientific problems related to the environmental conditions and processes in buildings
- 2 Describe and evaluate factors which influence human comfort juxtaposed with the utility, sustainability and energy efficiency of buildings, with respect to temperature, humidity, air movement, lighting and noise levels.
- 3 Identify the properties of common building materials and classify their performance characteristics, with due regard to the natural environment and potential environmental impacts
- 4 Describe the thermal properties of common building structures and evaluate heat losses from simple buildings.

## Learning Outcomes of Assessments

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

ONLINE MULTI CHOICE TEST	1	2	3	4
PORTFOLIO	1	2	3	4

## Outline Syllabus

*Light; scientific properties of light, units and measurement of light, lighting levels for buildings. Artificial lighting systems and equipment; lamps & luminaires, Lumen system of lighting design, colour rendering. Use of natural light; daylight factors.*

*Acoustics; nature of sound, nature of hearing, properties of sound (frequency, pitch, amplitude etc), measurement of sound levels, logarithms to base 10 and the decibel system. Noise in buildings; measurement of noise, noise transfer, noise control, sound insulation & absorption, attenuation. Room acoustics; reflection, absorption, reverberation.*

*Properties of air, moisture in air, vapour, humidity and condensation. Condensation in buildings, interstitial condensation.*

*Energy use in buildings; thermal comfort, heat losses and gains, energy balance, energy regulations.*

*Maintenance and replacement of building components,*

*Sustainability and environmental issues relating to procurement of materials and construction methods.*

*Properties, design criteria and specification of a range of materials including bricks and brickwork, cement, mortar, concrete, plaster, metals, alloys, timber (including engineered timbers), clay products, insulation materials and polymers including vapour and damp-proofing barriers.*

*Use of protective coatings including paints, stains and renders.*

*Heat and heat transfer; radiation, conduction & convection. Thermal properties in buildings; thermal insulation, thermal capacity, thermal resistance of building components, thermal bridging.*

*Thermal properties of common materials and structures, thermal conductivities and U values.*

## **Learning Activities**

Students will be supported in their learning, to achieve the above learning outcomes, in the following ways:

The module is based on a lecture programme including video and presentations together with a number of practical laboratory sessions.

Students are encouraged to develop competence using scientific equipment in an active learning approach. Laboratory work will have an emphasis on the manipulation, interpretation and analysis of the data, which should allow reasoned conclusions and recommendations to be made.

Certain key mathematical skills will be integrated within the laboratory practical activities.

## **Notes**

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