

## Liverpool John Moores University

Title: BUILDING SERVICES ENGINEERING MATHEMATICS  
Status: Definitive  
Code: **5508BEFDS** (118451)  
Version Start Date: 01-08-2011

Owning School/Faculty: Built Environment  
Teaching School/Faculty: Liverpool Community College

Team	Leader
Derek King	Y

**Academic Level:** FHEQ5  
**Credit Value:** 12.00  
**Total Delivered Hours:** 59.00  
**Total Learning Hours:** 120  
**Private Study:** 61

### Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	36.000
Practical	8.000
Tutorial	12.000

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Controlled assignment under exam conditions	100.0	3.00

### Aims

*This module aims to provide the students with the fundamental mathematical and analytical techniques to support the mathematical and analytical functions required in the other modules of the programme. This module is intended to enable students studying the commercial pathway of the Building Services programme to apply analytical techniques associated with statistical analysis, heat transfer and electrical waveforms.*

## Learning Outcomes

After completing the module the student should be able to:

- 1 Construct differential equations for the purpose of solving building services problems.
- 2 Demonstrate a knowledge of the properties of trigonometrical functions and relate these to the characteristics of wave forms
- 3 Analyse and solve problems using statistics and probability.

## Learning Outcomes of Assessments

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

EXAM                                 1      2      3

## Outline Syllabus

*Differential Equations: General and particular solutions. Boundary condition.*

*Differential equation models in building services engineering.*

*Trigonometrical Functions: Properties of waves: Amplitude, wavelength, frequency, phase difference, etc*

*Graphs: Sin  $\theta$ , cos  $\theta$ , sin  $2\theta$ , sin  $\theta/2$  etc.*

*Trigonometrical identities: sin  $\theta$ /cos  $\theta$  = tan  $\theta$ , sin<sup>2</sup>  $\theta$  + cos<sup>2</sup>  $\theta$  = 1, compound angle ,formula, etc*

*Addition of wave-forms: a sin $\theta$  + b cos $\theta$  = R sin ( $\theta$   $\pm$   $\alpha$ )*

*Statistics and Probability: Mutually exclusive and independent events. Binomial, Poisson and normal distributions.*

*Matrices: Multiplication, transposition and inversion, applications.*

## Learning Activities

Lectures, tutorials, practicals

## References

<b>Course Material</b>	Book
<b>Author</b>	Greer, A. & Taylor, G.
<b>Publishing Year</b>	2004
<b>Title</b>	Mathematics for Technicians
<b>Subtitle</b>	
<b>Edition</b>	
<b>Publisher</b>	Nelson & Thorns
<b>ISBN</b>	928-0-7487-7949-9

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## **Notes**

This module provides fundamental mathematical and analytical techniques to support and contextualise the mathematical and analytical functions required in the other modules of the programme, such as statistical analysis, heat transfer and electrical waveforms.