Liverpool John Moores University

Title:	MATHEMATICS FOR BUILDING SERVICES APPLICATIONS
Status:	Definitive
Code:	**4500BEFD** (108438)
Version Start Date:	01-08-2011
Owning School/Faculty:	Built Environment
Teaching School/Faculty:	Liverpool Community College

Team	Leader
Derek King	Y

Academic Level:	FHEQ4	**Credit Value:**	12.00	**Total Delivered Hours:**	57.00
Total Learning Hours:	120	**Private Study:**	63		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	42.000
Tutorial	12.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	End of module formal exam.	50.0	3.00
Technology	AS2	3 assignments	50.0	

Aims

To provide the learner with the opportunity to acquire knowledge of a range of mathematical techniques and will develop his/her understanding of how these techniques can be applied to the solution of problems encountered in Building Services Engineering.

The knowledge and skills which the learner acquires in this unit will underpin his/her study of most other modules in the programme.

Learning Outcomes

After completing the module the student should be able to:

1 Solve indical equations by the using the laws of indices and logarithms.
2 Apply the techniques of differential calculus to determine rates of change and to establish maximum and minimum values.
3 Apply integral calculus and use it to calculate areas under graph curves.

Learning Outcomes of Assessments

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

EXAM	1	2	3
Technological task	1	2	3

Outline Syllabus

Laws of Indices and Logarithms:
Indices: Recall the laws of indices and use these to simplify algebraic expressions.
Exponential functions: The nature and value of e. Calculations involving ex and e-x.
Graphs of exponential growth and decay. The gradient of an exponential curve.
Logarithms: Definition of a logarithm. Conversion between index and log form. The laws of logarithms. Common & Napierian logarithms. Indicial equations.
Differential Calculus:
Basic principles: Gradients of straight lines and curves. The differential coefficient. Differentiating algebraic, trigonometrical, exponential and logarithmic expressions. The second derivative. Velocity and acceleration.
Maxima & minima: Identification and location of turning points. Practical applications involving maximum and minimum values.
Method of least squares: Determining the line of best fit for graphs drawn from experimental data.
Integral Calculus:
Basic principles: Integration as the reverse of differentiation. Integrating algebraic and trigonometrical functions.
The definite integral: Calculating areas under graph curves. Practical applications, such as the calculation of work done during thermodynamic processes.
Numerical integration: Use of Simpson's rule as an alternative method for calculating areas under graph curves and performing definite integration.

Learning Activities

Lectures, tutorials.

References

Course Material	Book
Author	Croft, A. & Davidson, R.
Publishing Year	2003
Title	Mathematics for Engineers
Subtitle	
Edition	
Publisher	Prentice-Hall
ISBN	013120193X

Notes

In common with other disciplines within engineering and construction, mathematics is crucial to all aspects of Building Services Engineering. Understanding key mathematical concepts and applying them successfully to solve problems are vital skills every building services engineering student must acquire. This module teaches, applies and nurtures those skills. The ethos of the module is to deliver these skills in an accessible and practically oriented manner so students build up their knowledge and understanding gradually so as to encourage students to engage fully in the problem-solving process.