

## Liverpool John Moores University

Title: MATHEMATICS FOR CONSTRUCTION  
Status: Definitive  
Code: **4612BECC** (128152)  
Version Start Date: 01-08-2021

Owning School/Faculty: Civil Engineering and Built Environment  
Teaching School/Faculty: Coleg Cambria

Team	Leader
Jeff Cullen	Y

**Academic Level:** FHEQ4  
**Credit Value:** 20  
**Total Delivered Hours:** 58  
**Total Learning Hours:** 200  
**Private Study:** 142

### Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	27
Tutorial	10
Workshop	19

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Test	AS1	Open Book Test (2 hours)	30	
Exam	AS2	Open Book Exam	70	2

### Aims

*This module aims to provide the learner with an understanding of the underpinning mathematical principles, techniques and applications in the construction industry.*

### Learning Outcomes

After completing the module the student should be able to:

- 1 Review mathematical techniques in algebra, geometry, trigonometry and calculus relevant to problems within the construction industry.
- 2 Apply mathematical methods to solve geometric and trigonometric problems in construction.
- 3 Apply analytical methods to the examination of structural elements and provide appropriate solutions.
- 4 Illustrate the application of calculus within construction by solving problems using differentiation and integration.

### Learning Outcomes of Assessments

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

Open Book	1			
Open Book	2	3	4	

### Outline Syllabus

*-Revision of whole numbers, fractions, indices, powers of 10, BIDMAS, percentages, ratios:*

*-Graphs*

*-Basic trigonometric ratios in right-angled triangles*

*-Pythagoras theorem*

*-Angles including angles in polygons(exterior, interior), in parallel lines*

*-Area and perimeter and volume of basic and composite shapes, with applications in engineering and construction including integration:*

*-Area under a curve/ Volumes of revolution / Numerical methods- trapezoidal rule, mid-ordinate, Simpson's rule*

*-Beams theory: types of beams and supports. Calculations of reaction forces, shear force and bending moment diagrams , slope/deflection of a beam using calculus of various cross-sections of beams*

*-Column theory: Calculation of centroids and moments of inertia using integration for long columns*

*-Differentiation - finding the gradients of functions at different points on curves, by finding derivatives, using standard results*

*-Applications of differentiation: Optimisation in construction, kinematics, structural mechanics, problems of maxima/minima, rates of change*

### Learning Activities

This module will utilise blended learning which will combine e-learning with more traditional teaching strategies. In addition, students will be encouraged to monitor their own learning on this module. Workshops and online learning materials will be used to provide an overview of each topic. The lectures will be delivered by the module team and on occasion, guest speakers

from different relevant professional backgrounds with particular expertise in aspects of the curriculum. Workshops will be used as space for students to explore and discuss issues in small groups and for tutors to identify individual learning needs of students.

## **Notes**

This module is designed to provide students with a range of mathematical skills and knowledge of the techniques and standard results, used to solve problems in the construction industry.

Students will be encouraged to apply appropriate analytical methods in different engineering situations.