

# MATH0049 Mathematics for Engineers 1

<i>Year:</i>	2021–2022
<i>Code:</i>	MATH0049
<i>Level:</i>	4 (UG)
<i>Normal student group(s):</i>	Students outside Mathematics
<i>Value:</i>	15 credits (= 7.5 ECTS credits)
<i>Term:</i>	1
<i>Assessment:</i>	85% examination, 15% coursework
<i>Normal Pre-requisites:</i>	A-level type mathematics, especially calculus.
<i>Lecturer:</i>	TBA

## *Course Description and Objectives*

The course is designed to introduce to students with diverse mathematical backgrounds the basic mathematical methods which occur most frequently in engineering. Topics covered include differentiation and integration with applications, some differential equations, basic vectors, numerical methods and some statistics and probability. Each topic is illustrated by a wide variety of examples.

## *Recommended Texts*

Relevant books are: (i) Stroud, *Engineering Mathematics* (Palgrave); (ii) Croft and Davison, *Mathematics for Engineers* (Prentice Hall); (iii) Kreyszig, *Advanced Engineering Mathematics* (Wiley).

## *Detailed Syllabus*

**Differentiation and Integration:** Revision of basic rules and methods for differentiating and integrating a function of one variable, maxima, minima and points of inflection.

**Partial Differentiation:** up to chain rule.

**Differential Equations:** First order equations with separable variables, first order linear equations.

**Vectors:** Addition of vectors, scalar and vector products, applications to three-dimensional geometry.

**Statistics and Probability:** Mean and standard deviation, regression and correlation.

**Numerical Methods:** Numerical integration, eg trapezium and Simpson's rules, Newton's method for solving algebraic equations.