

Module Code	MAU11E02
Module Name	Engineering Mathematics II
ECTS Weighting¹	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Prof Miriam Logan
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	<p>On successful completion of this module, students should be able to:</p> <p>LO1. Integrate by parts, integrate trigonometric and rational functions; LO2. Use integration to solve geometrical problems, such as finding volumes, areas and lengths; LO3. Evaluate improper integrals; LO4. Formulate and solve a first order differential equations; LO5. Determine if a sequence converges or not; LO6. Test a series for convergence; LO7. Approximate a function by polynomials; LO8. Apply vectors to geometrical problems in space; LO9. Calculate solutions to systems of linear equations and find inverse matrices by different methods, and describe why some methods are more efficient than others.</p> <p>Graduate Attributes: levels of attainment</p> <p>To act responsibly – acts on the basis of knowledge and understanding, knows how to deal with ambiguity. <i>Choose an item.</i></p> <p>To think independently – thinks creatively and analyses and synthesises evidence. <i>Choose an item.</i></p> <p>To develop continuously – has a passion to continue learning. <i>Choose an item.</i></p> <p>To communicate effectively – is expert in the communication tools of a discipline. <i>Choose an item.</i></p>
Module Content	<ul style="list-style-type: none"> • Evaluation of integrals; • Notion of a differential equation; • Polynomials, sequences and series including simple convergence tests, Taylor and Maclaurin Series; • Vectors and their use for describing lines and planes in space, scalar and cross products; • Gaussian elimination; • Matrix algebra; • Theorems on existence of matrix inverses;

- Determinants.

Teaching and Learning Methods

The teaching strategy is a mixture of lectures and problem-solving tutorials. The format of lectures is conventional, however, the atmosphere is informal, and interaction and discussion is normal. Students are encouraged to ask questions in the lectures. In the tutorials, the students work on problems to practise and apply the methods introduced in the lectures. Discussion of problems in small groups is encouraged and facilitated.

Assessment Details² Please include the following: <ul style="list-style-type: none"> • Assessment Component • Assessment description • Learning Outcome(s) addressed • % of total • Assessment due date 	Assessment Component	Assessment Description	LO Addressed	% of total	Week due
	Homework assignments	Between five and ten questions are assigned for grading each week.	Develop understanding and gain practice in solving problems.	20%	Every week starting the second week of term
	Final Exam	Two hour exam with questions covering all the material covered in the course.	Tests the understanding of the underlying theory and the application of that theory when solving problems.	80%	Exam period

Reassessment Requirements

Contact Hours and Indicative Student Workload²

Contact hours: 44
Independent Study (preparation for course and review of materials): 1 hour per week (12 hours in total per semester)
Independent Study (preparation for assessment, incl. completion of assessment): 1 hour per week (12 hours in total per semester)

Recommended Reading List

Main texts for the course:
Required Texts:

- Single Variable Calculus 7th ed. Early Transcendentals by James Stewart. (For integrals, sequences, series, differential equations) SEP

- Multivariable Calculus 7th ed. Early Transcendentals by James Stewart. (For vectors in R^3 and equations of planes)
- Linear Algebra and its applications, David Lay, 4th ed., Pearson 2012.

Supplementary Texts:

- Calculus: Late Transcendentals 10th edition, Howard Anton, Irl C. Bivens, Stephen Davis
- Elementary Linear Algebra – with Supplementary applications 11th edition, Howard Anton and Chris Rorres

Module Pre-requisite

MA1E01

Module Co-requisite

Module Website

<https://www.tcd.ie/Engineering/undergraduate/baiyear1/modules/1E2.pdf>

Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.

School of Mathematics

Module Approval Date

Approved by

Academic Start Year

Academic Year of Date