UNIVERSITY OF LONDON

Course information 2026-27

MT2176 Further Calculus

General information

MODULE LEVEL: 5

CREDIT: 15

NOTIONAL STUDY TIME: 150 hours

MODE: Locally Taught, Independent Learner Route and Online Taught

Summary

This half course provides students with useful techniques and methods of calculus and enables students to understand why these techniques work. Throughout, the emphasis is on the theory as well as the methods.

Conditions

Please refer to the relevant programme structure in the EMFSS Programme Regulations to check:

- where this course can be placed on your degree structure; and
- details of prerequisites and corequisites for this course.

You should also refer to the Exclusions list in the EMFSS Programme Regulations to check if any exclusions apply for this course.

Aims and objectives

The objectives specifically include:

- enable students to acquire further skills in the techniques of calculus,
- enable understanding of the principles underlying the subject of calculus,
- prepare students for further courses in mathematics and/or related disciplines (e.g. economics, actuarial science).

Learning outcomes

At the end of the course and having completed the essential reading and activities students should be able to:

- demonstrate knowledge of the subject matter, terminology, techniques and conventions covered in the subject,
- demonstrate an understanding of the underlying principles of the subject,
- demonstrate the ability to solve problems involving an understanding of the concepts.

Global Employability Skills

Below are the three most relevant employability skills that students acquire by undertaking this course which can be conveyed to future prospective employers:

1. Adaptability and resilience
2. Complex problem solving
3. Decision making

Essential reading

For full details, please refer to the reading list

Adam Ostaszewski Advanced Mathematical Methods. (Cambridge: Cambridge University Press, 2008) [ISBN 978-0521289641]

Ken Binmore and Joan Davies Calculus: Concepts and Methods. (Cambridge (Cambridge: Cambridge University Press, 2002) second edition [ISBN 978-0521775410]

Assessment

This course is assessed by a two-hour and fifteen-minute closed-book written examination.

Syllabus

This course follows on from Calculus and Algebra, and continues further the study of calculus techniques and theory. The course will develop further the theory of functions, and will also include some new practical skills, such as how to evaluate double integrals and how to use Laplace transforms to solve differential equations.

Functions of one variable: Limits; continuity; differentiability; Taylor's Theorem; L'Hôpital's rule. The

Riemann integral: The definition of the Riemann integral; the Fundamental Theorem of Calculus.

Improper integrals: The definition of an improper integral; tests for the convergence of an improper integral with a positive integrand (including the direct comparison test and the limit comparison test); absolute convergence of improper integrals with an integrand of variable sign.

Double integrals: Double integrals; repeated integrals; change of variable techniques.

Manipulation of integrals: Joint continuity and the manipulation of proper integrals; dominated convergence and the manipulation of improper integrals; the Leibniz rule for differentiating an integral.

Laplace transforms: The definition of the Laplace transform; functions of at most exponential growth; standard Laplace transforms; properties of the Laplace transform; the Gamma function; using Laplace transforms to solve differential equations; convolutions and the Convolution Theorem; the Beta function.