UNIVERSITY OF LONDON

Course information 2020-21
MT105a Mathematics 1 (half course)

General information

COURSE LEVEL: 4

CREDIT: 15

NOTIONAL STUDY TIME: 150 hours

Summary

This half course develops basic mathematical methods and will emphasise their applications to problems in economics, management and related areas.

Conditions

Exclusions: You may not register for this course in the same year as:

- MT1174 Calculus
- MT1186 Mathematical Methods

Aims and objectives

The objectives specifically include:

- To enable students to acquire skills in the methods of calculus (including multivariate calculus) and linear algebra, as required for their use in economics-based subjects.
- To prepare students for further units in mathematics and/or related disciplines.

Learning outcomes

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

- used the concepts, terminology, methods and conventions covered in the half course to solve mathematical problems in this subject.
- the ability to solve unseen mathematical problems involving understanding of these concepts and application of these methods
- seen how mathematical techniques can be used to solve problems in economics and related subjects

Essential reading

For full details, please refer to the reading list.

Anthony, M. and N. Biggs *Mathematics for Economics and Finance*. (Cambridge: Cambridge University Press, 1996) [ISBN 978-0521559133]

Please consult the current EMFSS Programme Regulations for further information on the availability of a course, where it can be placed on your programme's structure, and other important details.

Assessment

This half course is assessed by a two-hour unseen written examination.

Syllabus

This half course develops basic mathematical methods and will emphasise their applications to problems in economics, management and related areas.

***Basics*:** Basic algebra; Sets, functions and graphs; Factorisation (including cubics); Inverse and composite functions; Exponential and logarithm functions; Trigonometrical functions.

***Differentiation*:** The meaning of the derivative; Standard derivatives; Product rule, quotient rule and chain rule; Optimisation; Curve sketching; Economic applications of the derivative: marginals and profit maximisation.

***Integration*:** Indefinite integrals; Definite integrals; Standard integrals; Substitution method; Integration by parts; Partial fractions; Economic applications of integration: determination of total cost from marginal cost, and cumulative changes.

***Functions of several variables*:** Partial differentiation; Implicit partial differentiation; Critical points and their natures; Optimisation; Economic applications of optimisation; Constrained optimisation and the Lagrange multiplier method; The meaning of the Lagrange multiplier; Economic applications of constrained optimisation.

***Matrices and linear equations*:** Vectors and matrices, and their algebra; Systems of linear equations and their expression in matrix form; Solving systems of linear equations using row operations (in the case where there is a unique solution); Some economic/managerial applications of linear equations.

***Sequences and series*:** Arithmetic and Geometric Progressions; Some Financial application of sequences and series.

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