Location: NYU London

Class code: MATH-UA9211002

Instructor Details: Simon Hubbert

Class Details: Mathematics for Economics II

Prerequisites: Mathematics for Economics I

Class Description: The course will provide the student with a clear exposition of the essential mathematical tools from calculus of several variables and linear algebra to solve problems arising in economics.

The course will be delivered by traditional “chalk and talk” lectures and supplemented with regular take home assignments.

Desired Outcomes:
- To employ the Lagrange technique for optimizing functions subject to simple linear constraints.
- To master the basic theory of linear algebra, specifically focusing on operation on vectors and matrices.
- An introduction to integration and its applications.
- To be able to solve simple differential equations which have their focus on topics in economics (compound interest and population models).

Assessment Components:
- Assignments 20%
- Midterm 40%
- Final 40%

Failure to submit or fulfill any required course component results in failure of the class.

Assessment Expectations:
- Grade A: Thorough understanding of both theory and its applications.
- Grade B: A good understanding of the theory and confidence in its applications.
- Grade C: A good understanding of the theory and reasonable competence in its applications.
- Grade D: A reasonable understanding of both theory and applications.
- Grade F: An inability to master both the theory and its applications to an acceptable level.

Required Text(s): Lectures will be self-contained.


To explore the subject in greater mathematical depth you can consider: Mathematics for Economists by Carl P. Simon and Lawrence Blume ISBN 978-0393117523

Internet Research Guidelines

None

Additional Required Equipment

Pen and paper.

Session 1

Intro and review of Partial differentiation. Crash course on Vectors.

No Assignment

Session 2


Assignment 1 set (due session 3)

Session 3

Constrained optimization. Economic examples and the geometry behind the search for a solution. Introduction to Lagrange multipliers and computational examples

Assignment 2 set (due session 4)

Session 4


Assignment 3 set (due session 5)

Session 5


Assignment 4 set (due session 6)

Session 6

Solving systems of equations: Gaussian elimination and pivoting. Cramer’s rule for the inverse.

Assignment 5 set (due session 7)

Session 7

Review for mid term

No assignment
| Session 8 | Mid-term test. Two hour in duration.  
No assignment |
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| Session 9 | Linear algebra with applications to Economics.  
Assignment 6 set (due session 10) |
| Session 10 | Introduction to integration – The geometric view as area under curve with examples. The analytic view as the inverse operation of differentiation.  
Assignment 7 set (due session 11) |
| Session 11 | Integration: Tools trick and valuations. Example to illustrate techniques.  
Assignment 8 set (due session 12) |
| Session 12 | Application of uses of integration in economics leading into an introduction to differential equations.  
Assignment 9 set (due session 13) |
| Session 13 | Application of differential equations in economics.  
Assignment 10 set (due session 14) |
| Session 14 | Review of Topics. A retrospective of the entire course.  
No assignment. |
| Session 15 | Final Exam. 2 hour exam covering the entire course. |
| Classroom Etiquette | Mobile phones switched off. |
| Required Co-curricular Activities |  |
| Estimated Travel Costs |  |
Dr Hubbert is a reader in mathematics and mathematical finance at Birkbeck, University of London.

He is the author of Essential Mathematics for Market Risk Management (Wiley Finance) and also a former practitioner in financial risk management at the Debt Management Office (a branch of HM-treasury).

His major research interests lie in approximation theory and applications where he has published on a variety of themes.

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http://www.nyu.edu/london/academics/attendance-policy.html

**NYU London work submission policies** can be found here:  
http://www.nyu.edu/london/academics/academic-policies.html