

MATH-UA9212L01

Mathematics for Economics II

NYU London

Instructor Information

- Dr Simon Hubbert
- Friday 11am. Email to confirm.

Course Information

- 9am – 12pm. Mondays
 - Room G03
- Mathematics for Economics I

Course Overview and Goals

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.

Upon Completion of this Course, students will be able to:

- To employ the Lagrange technique for optimizing functions subject to simple linear constraints.
- To master the basic theory of linear algebra, specifically focusing on operations 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).

Course Requirements

Grading of Assignments

The grade for this course will be determined according to these assessment components:

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Assignments/ Activities	Description of Assignment	% of Final Grade	Due
Assignment	Problem sheet testing knowledge and application of material covered in lectures	20%	weekly
Midterm	2hr test consisting of 12 multiple choice questions and 5 free response questions.	40%	Session 10
Final	2hr exam covering the whole course. Same format as midterm test.	40%	Final session

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

Grades

Letter grades for the entire course will be assigned as follows:

Letter Grade	Percent	Description
A	93.5% and higher	Thorough understanding of both theory and its applications. Excellent mathematical communication skills.
B	82.5% - 87.49%	A good understanding of the theory and confidence in its applications. Good mathematical communication skills.
C	72.5% - 77.49%	A good understanding of the theory and reasonable competence in its applications. Average mathematical communication skills.
D	62.5% - 67.49%	A reasonable understanding of both theory and applications. Basic mathematical communication skills.
F	59.99% and lower	An inability to master both the theory and its applications to an acceptable level. Poor mathematical communication skills.

Course Materials

Required Textbooks & Materials

Lectures will be self-contained and notes will be supplied.

Optional Textbooks & Materials

- A less theoretical and more practical text is: Mathematics for Economics and Business (7th Edition) by Ian Jacques. ISBN 978-0273763567.
- A text that captures the middle ground between theory and practice is Essential Mathematics for Economic Analysis (4th Edition) by Knut Sydsaeter and Peter Hammond with Arne Strom. ISBN 9780273787624

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

Resources

- **Access your course materials:** [NYU Classes](http://nyu.edu/its/classes) (nyu.edu/its/classes)
- **Databases, journal articles, and more:** [Bobst Library](http://library.nyu.edu) (library.nyu.edu)
- **NYUL Library Collection:** [Senate House Library](http://catalogue.libraries.london.ac.uk) (catalogue.libraries.london.ac.uk)
- **Assistance with strengthening your writing:** [NYU Writing Center](http://nyu.mywconline.com) (nyu.mywconline.com)
- **Obtain 24/7 technology assistance:** [IT Help Desk](http://nyu.edu/it/servicedesk) (nyu.edu/it/servicedesk)

Course Schedule

Session/Date	Topic	Reading	Assignment Due
Session 1:	Intro and review of Partial differentiation. Crash course on Vectors.	NA	NA
Session 2:	Geometrical and algebraic view of directional derivatives. Properties of the gradient vector. Numerical calculations.	HWK1	Session 3
Session 3:	Constrained optimization. Economic examples and the geometry behind the search for a solution. Introduction to Lagrange multipliers and computational examples	HWK2	Session 5
Session 4:	The Lagrange method (an alternative approach). More examples. The economic significance of the Lagrange multiplier.		NA
Session 5:	Introduction to matrix algebra. Basic operations. Real world examples. Notion of the inverse of a matrix. Computation of determinants.	HWK3	Session 7
Session 6:	Solving systems of equations: Gaussian elimination and pivoting. Cramer's rule for the inverse.	HWK4	Session 8
Session 7:	Linear Algebra examples and problem solving.		NA
Session 8:	Input output models. Introduction to integration		NA
Session 9:	Review		Session 10
Session 10:	Midterm Test		Session 11

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Session/Date	Topic	Reading	Assignment Due
Session 11:	Introduction to integration – The geometric view as area under curve with examples. The analytic view as the inverse operation of differentiation. Tools trick and valuations. Example to illustrate techniques.	HWK5	Session 12
Session 12:	Application of uses of integration in economics leading into an introduction to differential equations.	HWK6	Session 14
Session 13:	Application of differential equations in economics.	HWK7	Session 14
Session 14:	Review of Topics. A retrospective of the entire course		
Final Assessment:	Final Exam. 2hours in duration.		

Classroom Etiquette

- No mobiles phones.

NYUL Academic Policies

Attendance and Tardiness

- Key information on NYU London’s absence policy, how to report absences, and what kinds of absences can be excused can be found on our [website](http://www.nyu.edu/london/academics/attendance-policy.html) (<http://www.nyu.edu/london/academics/attendance-policy.html>)

Assignments, Plagiarism, and Late Work

- You can find details on these topics and more on this section of our NYUL [website](https://www.nyu.edu/london/academics/academic-policies.html) (<https://www.nyu.edu/london/academics/academic-policies.html>) and on [the Policies and Procedures section of the NYU website](https://www.nyu.edu/academics/studying-abroad/upperclassmen-semester-academic-year-study-away/academic-resources/policies-and-procedures.html) for students studying away at global sites (<https://www.nyu.edu/academics/studying-abroad/upperclassmen-semester-academic-year-study-away/academic-resources/policies-and-procedures.html>).

Classroom Conduct

Academic communities exist to facilitate the process of acquiring and exchanging knowledge and understanding, to enhance the personal and intellectual development of its members, and to advance the interests of society. Essential to this mission is that all members of the University Community are safe and free to engage in a civil process of teaching and learning through their experiences both inside and outside the classroom. Accordingly, no student should engage in any form of behaviour that interferes with the academic or educational process, compromises the personal safety or well-being of

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another, or disrupts the administration of University programs or services. Please refer to the [NYU Student Conduct Policy](#) for examples of disruptive behavior and guidelines for response and enforcement.

Disability Disclosure Statement

Academic accommodations are available for students with disabilities. Please contact the Moses Center for Students with Disabilities (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

Instructor Bio

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.