

SAMPLE SYLLABUS

MATH-UA9132L01 Mathematics for Economics II

NYU London: Spring 2020

Instructor Information

- Dr Simon Hubbert
- Room 756, School of Economics, Mathematics and Statistics, Birkbeck, University of London, London WC1E 7HX.

Course Information

- Mondays and Wednesdays 10:45-12:00.
 - Room G04
- Mathematics for Economics II

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:

Assignments/ Activities	Description of Assignment	% of Final Grade	Due
Assignment	Problem sheet testing knowledge and application of material covered in lectures	20%	weekly
Midterm	90 minute test covering material from first half of the course.	40%	Session 8 (March 23)
Final	2hr exam covering the whole course.	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

- 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

Date	Topic	Reading
Week 1 Mon 03/02	Introduction and review. Partial differentiation.	Week 1. Notes uploaded
Week 1 Wed 05/02	A crash course on vectors.	
Week 2 Mon 10/02	Geometrical and algebraic view of directional derivatives	Week 2. Notes uploaded
Week 2 Wed 12/02	Properties of the gradient vector. Numerical calculation of directional derivatives.	
Week 3 Mon 17/02	Constrained optimization. Economic examples and the geometry behind the search for a solution.	Week 3. Notes uploaded
Week 3 Wed 19/02	Introduction to Lagrange multipliers and computational examples.	
Week 4 Mon 24/02	The Lagrange method (an alternative approach). Further numerical examples.	Week 4. Notes uploaded
Week 4 Wed 26/02	The economic significance of the Lagrange multiplier.	
Week 5 Mon 02/03	Introduction to matrix algebra. Basic operations. Real world examples.	Week 5. Notes uploaded
Week 5 Wed 04/03	Notion of the inverse of a matrix. Computation of determinants.	
Week 6 Mon 09/03	Solving systems of equations: Gaussian elimination and pivoting.	Week 6. Notes uploaded

Date	Topic	Reading
Week 6 Wed 11/03	Cramer's rule for the inverse.	
Week 7 Mon 16/03	Numerical Linear algebra examples.	Week 7. Notes uploaded
Week 7 Wed 18/03	Review for Midterm	
Week 8 Mon 23/03	Mid Term Test (90minutes)	Week 8. Notes uploaded
Week 8 Wed 25/03	Review of Mid Term Test	
Week 9 Mon 30/03	Linear algebra with applications to Economics.	Week 9. Notes uploaded
Week 9 Wed 01/04	Linear algebra with applications to Economics continued.	
Week 10 Mon 06/04	Introduction to Integration.	Week 10. Notes uploaded
Week 10 Wed 08/04	Integration continued. The geometric view as area under curve with examples.	
Week 11 Mon 20/04	Integration techniques and rules for valuation.	Week 11. Notes uploaded
Week 11 Wed 22/04	Integration with Economic applications	
Week 12 Mon 27/04	Introduction to differential equations.	Week 12. Notes uploaded
Week 12 Wed 29/04	Solution methods for differential equations.	
Week 13 Mon 04/05	Application of differential equations in economics.	Week 13. Notes uploaded
Week 13 Wed 06/05	Application of differential equations in economics continued.	
Week 14 Mon 11/05	Review lecture – first half of course	Week 14. Notes uploaded
Week 14 Wed 13/05	Review lecture – second half of course	

Date	Topic	Reading
Week 15 TBC	FINAL EXAM	

Classroom Etiquette

- No mobile 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 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.