Exchange programme Vrije Universiteit Amsterdam

Vrije Universiteit Amsterdam - Exchange programme Vrije Universiteit Amsterdam - 2024-2025

Exchange

Vrije Universiteit Amsterdam offers many English-taught courses in a variety of subjects, ranging from arts & culture and social sciences, neurosciences and computer science, to economics and business administration.

The International Office is responsible for course approval and course registration for exchange students. For details about course registration, requirements, credits, semesters and so on, please visit the exchange programmes webpages.

Quantitative Research Methods I

Course Code	E_EBE1_QRM1
Credits	6
Period	P1
Course Level	100
Language Of Tuition	English
Faculty	School of Business and Economics
Course Coordinator	dr. R. de Vlaming
Examiner	dr. R. de Vlaming
Teaching Staff	dr. R. de Vlaming, dr. X. Yu, M.K. Knopper
Teaching method(s)	Written partial exam, Computer lab, Lecture, Instruction course

Course Objective

Quantitative Research Methods I is the first course of our academic core, teaching you how to use mathematics to solve analytical problems and research questions (Academic and Research Skills).

In this course, you will learn to apply important concepts and techniques from Calculus, Linear Algebra, and Statistics. These tools are not only relevant in an academic setting, but also help you tackle problems in Business and Economics (Bridging Theory and Practice – Knowledge).

In addition, throughout this course, you will formulate real-world questions as mathematical problems that you solve, and then translate back to real-world answers (Bridging Theory and Practice – Application).

After completing this course, you can

1. read and write mathematical expressions involving variables, constants, and various operators using standard notation;
2. manipulate expressions (e.g. involving the summation operators) and solve equations;
3. differentiate and integrate functions;
4. explain why derivatives and integrals are intimately related;
5. find extreme values of functions, with and without constraints;
6. visualize and differentiate implicit functions;
7. derive the elasticity of a function;
8. use vector and matrix notation;
9. apply basic matrix operations, such as matrix multiplication and taking the transpose;
10. explain and utilize the properties of the matrix inverse and the identity matrix;
11. solve systems of linear equations;
12. formulate and solve linear programming problems;
13. calculate and interpret descriptive statistics;
14. write mathematical expressions and equations using Microsoft Word;
15. use Microsoft Excel, including the Solver add-in, to solve several mathematical problems covered in this course; and
16. explain the relevance of the techniques covered in this course for Business and Economics.

Course Content

In Business and Economics, we use many mathematical models and techniques. For instance, the conditions for market and price equilibrium can be formulated mathematically. Similarly, we can use mathematics to quantify risk and optimize investment portfolios. As a result, mathematics is a challenging, but highly relevant topic for students in Business and Economics.

Mathematics is, of course, more than just a set of formulas, calculations, and numbers: it is a language. This language is crucial in developing an analytical way of thinking, that is not only at the core of good academic work, but also key to being a successful professional in Business and Economics. In other words, it is the first step on the path of understanding the power of quantitative and mathematical approaches, to solve problems you will face well beyond your studies.

In this course, you will learn about important concepts and techniques from various branches of mathematics, such as Calculus and Linear Algebra. You can use this knowledge to formulate and solve many questions in Business and Economics.

For accurate formulation and presentation of such models and techniques, you should be able to typeset formulas, for instance using Microsoft Word. In addition, for many problems, you need to use appropriate software, such as Microsoft Excel, to convert a theoretical solution to an actual, numerical solution. Therefore, in this course, you will also develop these general skills.

Additional Information Teaching Methods

Lectures, Tutorials, and Computer tutorials

Method of Assessment

Digital partial exams and written final exam

Literature

- Sydsæter, K., Hammond, P., Strøm, A. and Carvajal, A. (2022), Essential Mathematics for Economic Analysis, 6th edition, Pearson Education.
- Additional documents via Canvas.

Additional Information

- Mandatory for Binding Recommendation on Continuation of Studies (BSA) in Year 1.
- You will work with Microsoft Word and Excel. In the mid-term exams, we use the English versions of Excel and Word.

Recommended background knowledge

Active command of mathematics at the high-school level. It can be helpful to refresh your skills in advance.