

Course Descriptions Bachelor 2024-2025 DRAFT

Course Title Quantitative Methods I
 Course Code EBC1007
 ECTS Credits 6,5
 Assessment Whole/Half Grades

Period	Start	End	Mon	Tue	Wed	Thu	Fri
1	2-9-2024	20-10-2024	L	X	X	L	X

Level Introductory
 Coordinator Dirk Tempelaar For more information:d.tempelaar@maastrichtuniversity.nl
 Language of instruction English
 Goals Active mastery and knowledge of basic mathematical and statistical techniques.

Description All students receive basic training in quantitative methods covering subjects from mathematics, statistics, and computer skills. The majority of this training is given in the first year. This period, you will be participating in what we call Quantitative Methods 1 (QM 1). It is followed by a second round of quantitative methods (QM 2) in period 4. In the second year, some additional subjects will be covered. The topics for the latter two courses and the period for the third course depend on your choice regarding study and specialization. In mathematics, we will repeat and extend your knowledge about functions and equations. Questions that play a role in this course are:
 * How to translate a given problem into a mathematical model. Most of these problems are questions for a maximum or minimum value or the significance of the problem – mathematically, the existence of a solution.
 * How to find maximum and minimum values for a function of one and two variables. We will make use of derivatives and partial derivatives to formulate equations and conditions for extreme values.
 * How to solve a system of equations, especially linear equations.

In statistics, we will focus on the following topics:
 * Methods of data collection and types of data.
 * Descriptive statistics: describing important characteristics of populations or samples by numerical methods as the mean, median, mode (measures of central tendency), variance, and standard deviation (measures of spread) as well as by graphical methods, like histograms, bar charts, or Box-and-Whiskers displays.
 * Probability theory, as an introduction to random variables.
 * Discrete random variables and the most important discrete probability distribution: the binomial distribution.
 * Continuous random variables and two continuous probability distributions: the uniform and the normal distribution.
 * Sampling distributions, as a first step to the topic that will dominate the QM statistics agenda from now on: inferential statistics, or inductive reasoning. Understanding why large samples provide so much more information than small samples is an important element of this first step.
 * The construction of confidence intervals to estimate unknown population parameters and
 * Hypothesis testing in the simplest case of one population. This includes concepts as null and alternative hypothesis, type I and type II errors, and the p-value of a hypothesis test.

Literature For mathematics, we will use a reader as required text:
 * QM 1 MATHEMATICS.

That reader will be made available in the StudentPortal, for free. In addition to this text, you will need to acquire a license for the calculus course in the:
 * SOWISO digital learning environment The statistics subject matter of this block corresponds to chapters 1-3, 5-12 of the Sharpe et al. textbook, which is the prescribed literature for both QM 1 and QM 2:
 * Sharpe, Norean R., De Veaux, Richard D., & Velleman, Paul F. (2019): Business Statistics, 4th ed. New York: Pearson Education International, Maastricht University Edition. Sharpe et al. is available through StudyStore in a bundle with a license of:
 * MyStatLab Student Access Kit. The most economical way to buy this textbook is as a wrapping, at StudyStore, the academic bookstore: the UM custom pack 9781787649811 CU.

Prerequisites This course is in transition for the bachelor Fiscal Economics.
 Please read:
 * the Addendum to Chapter XVI SBE Bachelor's study programmes, article 16.8 in the SBE BSc EER 2023-2024
 * the Transitional Regulations for BSc Fiscal Economics, Appendix I article 8 in the SBE BSc EER 2023-2024

The following rule applies to bachelor Fiscal Economics students.
 TRANSITIONAL REGULATION (EBC1007):
 The bachelor Fiscal Economics has been discontinued.

Whether a course is in transition, cancelled, or replaced depends on the cohort you are in. Sometimes there are additional criteria. It is therefore very important to carefully read the EER and the addendum so you can apply the rules to your individual situation.

PREREQUISITES:
 Math secondary school at "minor" level.

Teaching methods PBL / Assignment / Papers
 Assessment methods Final Paper / Written Exam / Assignment

Evaluation in previous academic year For the complete evaluation of this course please click <http://iwio-sbe.maastrichtuniversity.nl/rapporten.asp?referrer=codeUM>

This course belongs to the following programme / specialisation

Bachelor Fiscal Economics Transitional Regulation