



**SUBJECT DATASHEET**

**QUANTITATIVE METHODS**

**BMEGT20M011**

# I. SUBJECT DESCRIPTION

## 1. SUBJECT DATA

**Subject name**

QUANTITATIVE METHODS

**ID (subject code)**

BMEGT20M011

**Type of subject**

Contact lessons

**Course types and lessons**

<i>Type</i>	<i>Lessons</i>
Lecture	2
Practice	2
Laboratory	0

**Type of assessment**

term grade

**Number of credits**

5

**Subject Coordinator**

<i>Name</i>	<i>Position</i>	<i>Contact details</i>
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Erdei János	senior lecturer	erdei.janos@gtk.bme.hu
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**Educational organisational unit for the subject**

Department of Management and Business Economics

**Subject website**

<https://edu.gtk.bme.hu>

**Language of the subject**

magyar - HU; angol - ENG

**Curricular role of the subject, recommended number of terms**

Programme: **Finance MSc (in English) from 2019/20/Term 1 AUTUMN start**

Subject Role: **Compulsory**

Recommended semester: **1**

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Programme: **Finance MSc (in English) from 2019/20/Term 1 SPRING start**

Subject Role: **Compulsory**

Recommended semester: **2**

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Programme: **Master of Science Program in Management and Leadership**

Subject Role: **Compulsory**

Recommended semester: **1**

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Programme: **MSc in Management and Leadership**

Subject Role: **Compulsory**

Recommended semester: **1**

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Programme: **MSc in Engineering Management**

Subject Role: **Compulsory**

Recommended semester: **1**

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**Direct prerequisites**

***Strong***    None

***Weak***     None

***Parallel***   None

***Exclusion***   None

**Validity of the Subject Description**

Approved by the Faculty Board of Faculty of Economic and Social Sciences, Decree No: 580439/11/2024 registration number. Valid from: 29.05.2024.

## 2. OBJECTIVES AND LEARNING OUTCOMES

### Objectives

The basic aim of the subject is to bring the knowledge acquired during the BSc degree to a same level, and in addition to acquaint the students with the basic mathematical knowledge and methods on which the theories and methods of business life are based. The aim of the subject is for the students to get to know the theoretical background in such depth that they can later use it independently, creatively in their further studies, as well as in practice.

### Academic results

#### Knowledge

1. Know the generally used definitions of probability theory, mathematical statistics,
2. You know the theorems based on conditional probability, understand the meaning of Bayes' theorem and can apply it to determine probabilities.
3. Knows the characteristics of probability variables, their theoretical background, the properties of theoretical distributions, the significance of the laws of large numbers, their theoretical background
4. knows the process of mathematical statistical data analysis, the essence of statistical inference, the concept of sampling error, methods of statistical inference
5. know the conditions for the use of estimation and hypothesis testing, the correct application of each method, the theoretical background to the methods, the use of other statistical tests in addition to the most common ones, and the practical aspects of the theoretical questions
6. know the principles of bivariate and multivariate correlation and regression, the assumptions and theoretical background of the linear regression model, the indicators of correlation and regression, the analysis procedure, the interpretation of results, the testing of the model
7. know the basic concepts of decision theory, decision classes, criteria, group decision problems, the use of ranking methods, testing results with statistical tests

#### Skills

1. Using the learned theories and methods, identify, systematize and analyze facts and basic connections, formulate independent conclusions, critical remarks, makes decision-making proposals, and makes decisions in routine and partly unknown - domestic and international - environments.
2. Are able to apply techniques for solving economic / technical / technological problems, problem solving methods, their application conditions and limitations.
3. Are suitable for preparing analyses, reports, surveys, independent and group work for critical and constructive problem management

#### Attitude

1. The ability to understand and communicate in a credible way the summary and detailed issues of your profession.
2. Your professional interests will deepen and consolidate.
3. Seek to cooperation in multidisciplinary teamwork.

#### Independence and responsibility

1. Has a high degree of autonomy in developing, presenting and justifying professional views on broad and specific professional issues.
2. It takes responsibility for taking the initiative to develop cooperation.
3. Take responsibility for analysis, conclusion and decision.

### Teaching methodology

Lectures, calculation tasks, communication in written and oral form, usage of IT tools and techniques, optional independent and in team performed tasks.

### Materials supporting learning

- Kövesi J. – Erdei J. Tóth Zs. E.: Kvantitatív módszerek, oktatási segédanyag, BME GTK, Budapest, 2015,
- Árvai G. – Erdei J. – Kövesi J. – Tóth Zs. E.: Kvantitatív módszerek, feladatgyűjtemény megoldásokkal, oktatási segédanyag, BME GTK, Budapest, 2015
- Egyéb, az oktatók által kiadott oktatási segédletek (képletgyűjtemény, gyakorló feladatok, stb.)
- Hunyadi L. - Vita L.: Statisztika közgazdászoknak, KSH, Budapest, 2002
- Kerékgyártóné, Gy. - Sugár, A. - Mundruczó Gy: Statisztikai módszerek és alkalmazásuk a gazdasági, üzleti elemzésekben, KSH, 1996

## II. SUBJECT REQUIREMENTS

### TESTING AND ASSESSMENT OF LEARNING PERFORMANCE

#### General Rules

The assessment of the learning outcomes formulated in point 2.2 takes place in the form of three midterms and optional partial performance evaluation (active participation).

#### Performance assessment methods

1. Performance assessment: During the semester, the learning of the curriculum is checked with three midterm tests. All three of the midterm tests materials are the material from the weeks before. Midterm tests are from theoretical questions, tests and task solutions. Only the published formulas collection, tables and calculators, not exceeding the level of the scientific calculator, may be used in the midterm test. Other supporting tools (notebooks, computers, mobile phones, etc.) cannot be used. A mobile phone or other communication

device that is turned on during the midterm test must not be with students. Manual notes or additions can not be in the formulas collection

or tables. The formulas collection used in midterm test are checked one by one. If notes are found in the formulas collection, the student is missed the midterm test. 2. Partial performance assessment (active participation): the subject's knowledge, optional performance

assessment, method of completion and the level of gathered scores are determined by the subject's lecturer. The gathered score in a partial performance assessment for each student shall not exceed 25% of the maximum score of the summary performance assessment for

that part of the curriculum. 3. There is no minimum score for summary performance assessments, and together with all midterm tests (plus the score obtained in the partial performance assessment) the 50% limit required to gather the term grade must be reached.

#### Percentage of performance assessments, conducted during the study period, within the rating

- 1. summary performance assessment: 25
- 2. summary performance assessment: 35
- 3. summary performance assessment: 40
- active participation: 25
- total: 100

#### Percentage of exam elements within the rating

#### Conditions for obtaining a signature, validity of the signature

#### Issuing grades

Excellent	94
Very good	84–94
Good	72–83
Satisfactory	60–71
Pass	50–59
Fail	0–49

#### Retake and late completion

1) After the periods with classes, the three midterm tests can be replaced/retaken together, in one repeat test. The result gathered at the retesting will count as the final result. Students who have not gathered the midterm grade after the replacement, will not fulfil the subject as there is no repeat of the repeat test. 2) The active participation cannot be replaced, improved or otherwise repla

#### Coursework required for the completion of the subject

részvétel a kontakt tanórákon	48
félévközi készülés a gyakorlatokra	24
felkészülés a teljesítményértékelésekre	42
kijelölt írásos tananyag önálló elsajátítása	36
összesen	150

#### Approval and validity of subject requirements

Consulted with the Faculty Student Representative Committee, approved by the Vice Dean for Education, valid from: 06.05.2024.

# III. COURSE CURRICULUM

## THEMATIC UNITS AND FURTHER DETAILS

### Topics covered during the term

To achieve the learning outcomes set out in section 2.2, the course consists of the following areas and topics. In the syllabuses of the courses advertised in each semester, these elements are scheduled according to the calendar and other conditions.

- 1 Introduction.
- 2 Probability calculation basics: probability calculation subject, stochastic events, event algebra basics, operations with events, probability concept, axiom system.
- 3 Methods for determining probability, concept of conditional probability, independence of events, probability calculation items.
- 4 Probability variables: distribution function, discrete and continuous probability variables, independence of probability variables, expected value, standard deviation, additional characteristics of probability variable.
- 5 Notable probability distributions: characteristic, binomial, Poisson, hypergeometric, discrete uniform, continuous uniform, exponential, normal.
- 6 Laws of big numbers, central boundary distribution.
- 7 Mathematical statistical basis, subject of mathematical statistics, sampling, number, criteria, purpose and methods of descriptive statistics.
- 8 Sampling and estimation: estimation of parameters, characteristics of the estimation, methods of point estimation, intervallum estimation.
- 9 Hypothesis test: purpose, tools, general course, grouping of statistical tests, nonparameter tests.
- 10 Application of parameter tests.
- 11 Correlation and regression calculation: type of relationships, two- and multi-variable regression model, metrics, regression model testing, interpretation of results.
- 12 Decision theory basics, decision classes, criteria.
- 13 Group decision, pair comparison, application of rank methods.

### Additional lecturers

Dr.Kövesi János Professor Emeritus kovesi.janos@gtk.bme.hu

Fatma Aslan researcher aslan.fatma@gtk.bme.hu

### Approval and validity of subject requirements