



# Applied Statistics

## General data

Course code:	M23KOA03E
ECTS credits:	6
Type of the course:	A1
Semester:	Fall
Course restrictions:	<i>Preferably BAM Business Statistics</i>
Course leader (with availabilities):	<i>Diána Fűrész, Dr.</i> <i>Assistant professor</i>  <i>B112 room</i>  <a href="mailto:furesz.diana@tk.pte.hu">furesz.diana@tk.pte.hu</a>

## 1. Description and aims

The course gives an overview of major methods regarding empirical work in economics, mostly concentrating on econometric techniques. The methods will be applied to various economic problems, demonstrating their practical applications. Students get hands-on experiences analyzing various economic issues with a variety of approaches. We use SPSS software for practical work. The module aims to deepen the statistical methodology studied at the BSc level and present its special applications in economics and business.

## 2. Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, students should be able to:

CILO1. know the basic principles of constructive modelling based on empirical data and the selection procedures used for optimal and economical modelling (PILO4);

CILO2. know the continuous and limited endogenous variable econometric models that can be used to solve the problems of business life and the procedures that enable the examination of the common effect of multiple variables (PILO4);

CILO3. know the correct method for exploring stochastic and causal relationships and the limitations of causality (PILO3, PILO4, PILO5);

CILO4. collect multivariate primary and secondary data files, clean data with appropriate procedures, and describe and plot them correctly and ethically (PILO3, PILO4, PILO7);

CILO5. choose an appropriate statistical-econometric procedure for examining a given hypothesis and know the conditions and limitations of the methods (PILO4, PILO5);

CILO6. use statistical software that facilitates the application of multivariate regression analysis and applies new methods based on public data (PILO4);

CILO7. perform analytical tasks ethically, furthermore, know and wish to avoid bias caused by incorrect data transformation (PILO7);



CILO8. argue supported by professional arguments and represent their opinion responsibly. Taking into account the consequences of the decisions based on it, and at the same time, regardless of the client's intentions (PILO8).

### 3. Content, schedule

1. Overview of Multivariate Methods
2. Preparing for Multivariate Analysis
3. Review of Descriptive Statistics and Statistical Inference
4. Exploratory Factor Analysis
5. Cluster Analysis
6. Midterm exam
7. Case Study 1 (Group work)
8. Multiple Regression
9. MANOVA: Extending ANOVA
10. Discriminant Analysis
11. Logistic Regression: Regression with a Binary Dependent Variable
12. Case Study 2 (Group work)
13. Data analysis with AI

### 4. Learning and teaching strategy, methodology

*Principal teaching methodologies:* lecture, in-class discussion, and group work.

This module consists of a combination of lectures and practical exercises. Two classes (2 times 75 minutes) per week in which theory is explained (CILO 1, 2, 3, 5) and applications are demonstrated. The seminars extend the students' statistical software (SPSS) knowledge to solve business-related problems and construct models based on the book's material (CILO 4, 5, 6). The Case Studies (2 times) support improving analytical skills by applying statistical methods to complex business problems. Students are expected to practice on their own based on the core learning materials during the course. Students receive statistical problems to analyze with SPSS at home during the study period. The lecturer is available for homework-related consultation in class; extra consultation is also possible in addition to the regular office hours.

### 5. Assessment

*Formative assessment elements:* Oral feedback on in-class activities; discussion of the solution regarding practical exercises solved during the classes.

*Summative assessment elements:*

<b>Individual Assessment</b>		80%	<b>Group Assessment</b>		20%		
Name of the element	Weight	Type	Details	Retake opportunity	Req.*	Related CILOs	Use of AI



Midterm	20%	Individual written exam	A written exam based on topics 1-4, containing 3-4 questions.	one retake opportunity	yes	1, 2, 3, 4, 5, 6, 7	<b>Not permitted</b>
Final exam	60%	Individual written exam	A written exam based on topics 1-13, containing 5-6 questions.	one retake opportunity	yes	1, 2, 3, 4, 5, 6, 7	<b>Not permitted</b>
Team presentation	20%	Oral group work	Group work outcome (based on case studies) is to be delivered as a presentation.	no	yes	1, 2, 3, 4, 5, 6, 7, 8	Permitted

\* Req.: Completing the element is required to pass the course, irrespective of the performance in other elements.

## 6. Learning materials

### Essential

- Hair, J.F. - Babin, B. J. - Anderson, R. E. - Black, W. C. (2018): Multivariate Data Analysis (Sections 1-3), Cengage.

### Recommended

- Jarjabka, Á. - Fűrész, D. I. - Havran, Z. (2024): The impact of cultural distance on the migration of professional athletes as high-skilled employees. Journal of Industrial and Business Economics
- Rappai, G. - Fűrész, D. I. (2022): Relationship Between Player Value and Competitive Balance Under the Assumption of Oligopoly. International Journal of Sport Finance, 17(1).
- Tyrrell, S. (2022): SPSS: Stats Practically Short and Simple.

## 7. Guidelines of using AI

The course takes the following positions from the positions included in UPFBE Policy for the Use of Artificial Intelligence Section 5.1:

In accordance with the UPFBE Policy for the Use of Artificial Intelligence, this course adopts **Position 2** regarding the use of AI. The use of AI tools is permitted, but only responsibly, under supervision, supplementing the students' own professional competence when solving the tasks detailed below.

One of the goals of the course is to enable students to critically evaluate the answers and solutions provided by AI in the field of statistics. For this, it is essential to acquire basic knowledge, for which the textbook and class material provide a solid foundation.

Another goal of the course is for students to learn to use AI tools consciously and actively when solving tasks and working. **Thus, the use of AI tools is permitted during group work and when preparing for exams/tests.**

During the assessment, we assess students' independent knowledge, understanding of the curriculum, and their ability to apply it. **Accordingly, the use of AI is not permitted during the midterm and final exams.**



## 8. Further information

<b>International</b> aspects embedded with the course
The global edition of the essential learning material contains many international problems. Case Studies during class.
<b>Ethics, Responsibility &amp; Sustainability (ERS)</b> aspects are embedded in the course.
Almost all chapters of the essential learning material and all lectures mention ethical considerations and the use of statistics.
<b>Connections to the world of practice</b> of the course
In case studies of the essential learning material, the lecturer shares her consulting and research experiences.