



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Econometric Data Analysis [S1DSwB1>EAD]

Course

Field of study

Data Science in Business

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

0

Other

0

Tutorials

30

Projects/seminars

0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Students are expected to have analytical thinking skills and a basic understanding of mathematical and statistical methods. Competencies in logical problem-solving, data interpretation, and fundamental probability theory will be beneficial. Openness to using computational tools for decision analysis is also recommended.

Course objective

The objective of the course is to develop skills in analyzing economic and financial data using econometric methods. Students will learn techniques for constructing, estimating, and evaluating econometric models, as well as methods for forecasting and modeling relationships between variables. The course emphasizes the practical application of econometrics in market analysis, business strategy, and economic decision-making, along with the use of modern simulation and forecasting tools.

Course-related learning outcomes

Knowledge:

Characterizes the basic concepts of applied econometrics, including parameter estimation, dependent and independent variables, and the methodology of economic and financial data analysis [DSB1_W01]. Describes the structure and interpretation of econometric models, verification of their assumptions, and methods for assessing model goodness-of-fit [DSB1_W04].

Explains the application of regression models, econometric forecasting, time series analysis, and probabilistic methods in business strategies [DSB1_W07].

Skills:

Designs econometric experiments, selects appropriate data analysis models, and applies parameter estimation methods [DSB1_U03].

Formulates the specification of econometric problems, assesses multicollinearity, heteroscedasticity, and autocorrelation in models, and interprets the obtained results [DSB1_U05].

Conducts a critical analysis of econometric models using significance tests and the coefficient of determination to evaluate model fit quality [DSB1_U07].

Applies econometric analysis standards by implementing multiple regression models, forecasting methods, and time series analysis (ARMA, ARIMA) [DSB1_U10].

Social competences:

Critically analyzes their own knowledge and skills in econometrics, striving for improvement and updates in the context of new data analysis methods [DSB1_K01].

Utilizes current scientific achievements in econometrics and data analysis, considering their application in business practice [DSB1_K02].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

There will be two tests, each graded in the form of points-50 points per test. The final grade is determined by the sum of points from both tests. The first test takes place midway through the course, while the second is at the end. The passing threshold is a total of 50 points from both tests.

Laboratories:

There will be two tests, each graded in the form of points-50 points per test. The final grade is determined by the sum of points from both tests. The first test takes place midway through the course, while the second is at the end. The passing threshold is a total of 50 points from both tests.

Programme content

The course covers key aspects of applied econometrics in the analysis of economic and financial data. Students will learn fundamental econometric concepts, model construction and interpretation, and parameter estimation methodologies. Techniques for assessing model fit and verifying assumptions such as heteroskedasticity, autocorrelation, and multicollinearity will be discussed.

The course includes multiple regression, variable selection methods, econometric forecasting, and time series analysis, including ARMA and ARIMA models. Additionally, students will explore panel data models, binary regression, the application of econometrics in business strategy, and the use of Monte Carlo simulations in econometric analysis.

Course topics

Introduction to Econometrics and Economic Data Analysis

Fundamental Econometric Concepts: Dependent and Independent Variables, Parameters, Estimation Construction and Interpretation of Econometric Models

Ordinary Least Squares (OLS) Method - Assumptions, Parameter Estimation

Model Goodness-of-Fit Assessment - Coefficient of Determination, Significance Tests

Verification of Econometric Model Assumptions - Heteroskedasticity, Autocorrelation, Residual Normality

Multiple Regression Models - Variable Selection and Multicollinearity Issues

Methods for Variable Selection in Econometric Models

Modeling Economic and Financial Phenomena

Econometric Forecasting - Prediction Methods and Forecast Error Evaluation

Time Series Analysis - Trend, Seasonality, and Cyclical Components
Autoregressive and Moving Average Models (ARMA, ARIMA) in Forecasting
Panel Data Models - Analysis of Multiple Units Over Time
Probabilistic and Binary Models - Logistic Regression, Probit, Tobit
Econometric Models in Market Analysis and Business Strategy
Use of Monte Carlo Simulations in Econometric Analysis

Teaching methods

Lectures: Problem-based lecture, case study presentation
Exercises: Problem-solving tasks, case study analysis, group work

Bibliography

Basic:

Bernardelli, M., Decewicz, A., Tomczyk, E. (2021). Ekonometria i badania operacyjne. PWN
Maciąg, A., Pietroń, R., Kukła, S. (2013). Prognozowanie i symulacja w przedsiębiorstwie. PWE

Additional:

Trzaskalik, T. (2024). Wprowadzenie do badań operacyjnych z komputerem. PWE

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	47	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	53	2,00