

Business Prognosis and Symulation - course description

General information	
Course name	Business Prognosis and Symulation
Course ID	06.9-WM-ZiIP-ANG-D-04_20
Faculty	Faculty of Mechanical Engineering
Field of study	Management and Production Engineering
Education profile	academic
Level of studies	Second-cycle studies leading to MSc degree
Beginning semester	winter term 2023/2024

Course information	
Semester	1
ECTS credits to win	3
Course type	obligatory
Teaching language	english
Author of syllabus	<ul style="list-style-type: none">dr inż. Julian Jakubowski, prof. UZ

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Laboratory	15	1	-	-	Credit with grade
Lecture	15	1	-	-	Exam

Aim of the course

Skills and competences: statistical data analysis, time series, the use of econometric models, quality models, methods for modelling discrete and continuous processes, use of methods of forecasting and simulation of processes in the enterprise.

Prerequisites

Basic knowledge of: manufacturing processes, economics, statistics. Thorough knowledge of Excel.

Scope

Lecture

W1 Production process. Manufacturing company. The importance of forecasts for the company. Basic concepts. Classification of forecasting methods. Forecasting process. Making managerial decisions. Forecasting methods. Forecasting horizon.

W2 Measures for the quality of forecasts. Errors of forecast ex post and ex ante.

W3 Quantitative forecasting methods. Forecasts based on time models. Formation of time series. Models of time series with trends.

W4 Analytical models. Linear exponential smoothing models. Autoregression and moving average (ARMA and ARIMA) models.

W5 Methods based on econometric models. Stages of formation of an econometric model. Single equation econometric models.

W6 Qualitative forecasting methods. Forecasting based on heuristics. Analogue models. Models with leading variables. Models of cohort analysis. Market tests

W7 Simulation of continuous and discrete processes.

W8 Application scenarios in forecasting.

Laboratory

L1 Application of the method of least squares in forecasting. Determination of the regression line. Implementation of MNK Excel (LINEST).

L2 Extrapolation of a linear function of trend. Determination of the point and interval forecasts.

L3 Forecasting using non-linear trend model. Linearization of a function.

L4 Forecasting based on time series. Random and seasonal fluctuations. Forecasting based on adaptation models. A naive method. Methods: simple moving average and weighted average.

L5 Exponential smoothing models (Brown's, Holt's and Winters')

L6 Econometric models.

L7 Heuristic forecasting methods.

Teaching methods

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
The student has an orderly theoretical knowledge of forecasting and simulation in an enterprise.	• K_W10	<ul style="list-style-type: none"> an exam - oral, descriptive, test and other an observation and evaluation of the student's practical skills 	<ul style="list-style-type: none"> Lecture
The student can use accepted methods and mathematical models and computer simulations to analyse and evaluate management systems and decision-making systems.	• K_U16	<ul style="list-style-type: none"> an evaluation test an ongoing monitoring during classes 	<ul style="list-style-type: none"> Laboratory
The student is able to both choose -and use- appropriate computer applications for calculating, simulating, designing and also verifying solutions in Management and Production Engineering.	• K_U11	<ul style="list-style-type: none"> a quiz an evaluation test 	<ul style="list-style-type: none"> Lecture Laboratory
The student understands the importance of the non-technical aspects and effects of engineering, including their impact on the environment; the student is aware of the responsibilities resulting from decisions taken in this regard.	• K_K02	<ul style="list-style-type: none"> activity during the classes an exam - oral, descriptive, test and other 	<ul style="list-style-type: none"> Lecture Laboratory
The student is able to design and apply tools for the quality control of processes and of mechanical engineering products	• K_U27	<ul style="list-style-type: none"> an ongoing monitoring during classes 	<ul style="list-style-type: none"> Laboratory

Assignment conditions

Lecture: lecture credit is awarded after passing a written exam which verifies the knowledge of the issues included in the lecture curriculum.

Laboratory: graded credit, based on the component ratings of current tests.

Recommended reading

1. Hanke J.E. Reitsch, Business Forecasting, Prentice Hall, Upper Saddle River, 1998.
2. Makridakis S., S.C. Wheelwright, V.E. McGee, Forecasting, John Wiley, New York 1983
3. Chambers J.C. Mullick S.T., Smith D.D. How to chose the right forecasting technique. Harvard Business Review, Vol. 4., 1991.

Further reading

1. Lapin L.L., StatisticfFor Modern Business Decision. Harcourt Brace Javanovich Inc., New York, 1987.

Notes

Modified by dr inż. Tomasz Belica (last modification: 12-04-2023 23:05)