SYLLABUS OF A MODULE

Polish name of a module	**Statystyka i ekonometria**
English name of a module	**Statistics and Econometrics**
ISCED classification - Code	0542
ISCED classification - Field of study	Statistics
Languages of instruction	*English*
Level of qualification:	*1*
Number of ECTS credit points	*6*
Examination:	*EW*
Available in semester:	*A*

Number of hours per semester:

Lecture	Exercises	Laboratory	Seminar	E-learning	Project
30E		30			

MODULE DESCRIPTION

Module objectives

O1. To provide students with a foundation to statistical analysis of data and to modelling of statistical relationship between observed phenomena in the uncertain environment.

O2. To equip students with mathematical concepts and tools that are used to analyze and solve statistical problems and to develop regression models

O3. To present various real-world applications of the statistical theory, especially in problems arising in finance, economics and engineering.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic probability theory (random variables, their distributions and characteristics), general mathematical maturity.

2. Basic linear algebra (matrix operations),

3. General mathematical maturity.

LEARNING OUTCOMES

LO 1 – The student lists the most important classes of problems resolved on the basis of statistical inference and properly classifies practical problems in order to choose methods for solving them.

LO 2 – The student verifies statistical hypotheses concerning various practical problems, with particular emphasis on typical problems appearing in economic ,finance and engineering.

LO 3 – The student knows and lists methods of estimating selected parameters of randomness and properly applies them to practical problems in the field of economics and social sciences.

LO 4 – The student analyzes the data underlying the regression-model's construction. The student properly chooses the methods of regression analysis depending on the nature of the possessed data and modifies the form of the model depending on the results of the verification.

LO 5 – Student uses a computer package to conduct a comprehensive data analysis, estimation of model parameters and its verification. The student correctly interprets the results; uses the obtained models to analyze relationship between model's variables and to predict values of the dependent variable.

MODULE CONTENT

Type of classes – lecture	Number of hours
Lec 1 : Overview of probability methods - introduction.	**2**
Lec 2 -**3**:Fundamentals of probability theory. Random variables, their distributions and characteristics – resume.	**4**
Lec 4 -5: Estimation theory – estimators and their features.	**4**
Lec 6 : Elements of the general theory of hypothesis testing.	**2**
Lec 7 : Testing hypotheses about distribution's parameters.	**2**
Lec 8,9 : Regression analysis – simple linear regression model. Least	**4**

squares method. Selected characteristics of the model quality.	
Lec 10 : Steps of the regression model building and its verification.	**2**
Lec 11-12: Multiple linear regression. Estimation of the model parameters and its verification. Computer usage. Case study.	**4**
Lec 13-14: Topics in nonlinear regression. Case studies.	**4**
Lec 15: Prediction and forecasting on the basis of the econometric model	**2**
Sum	**30**

Type of classes– laboratory.	**Number of hours**
Lab 1 - Introduction to lab. Getting familiar with the software	**2**
Lab 2-3:- Random variables and their distributions. Generating pseudorandom samples. Descriptive statistics – Plotting data	**4**
Lab 4-5: Computing statistical measures, their interpretation. Sample distribution and related sample-mean-distribution. Normal distribution, Student-t distribution.	**4**
Lab 6-7: Point and interval estimation	**4**
Lab 8-9 - Hypothesis testing	**4**
Lab 10 -11: Linear regression model building.	**4**
Lab 12-13: Multiple linear regression.	**2**
Lab 14,15: Nonlinear-in-variables-regression-model.	**3**
Lab 15: Labs resume, assessment of students achievements.	**1**
Sum	**30**

TEACHING TOOLS

1. – multimedia presentations
2. – lecture notes
3. – problem sets for students
4. – work with computer software(lab) plus traditional face-to-face, whiteboard-supported   tutorials

WAYS OF ASSESSMENT (F – FORMATIVE, S – SUMMATIVE

F1. – assessment of student's activity during classes
F2. – assessment of the ability to make use of the acquired knowledge
F3. – assessment of the correctness of solutions to given problems
F4. – assessment of the quality of presentation of acquired knowledge and skills
S1. – assessment of problem-solving skills - a report (Project) containing complete solutions to problems given and discussed during labs
S2. – assessment of the degree to which the teaching material is known and understood by student – open-book written exam

*) in order to receive a credit for the module, the student is obliged to attain a passing grade in all laboratory classes as well as in achievement tests.

STUDENT'S WORKLOAD

L.p.	Forms of activity	Average number of hours required for realization of activity
1. Contact hours with teacher		
1.1	Lectures	30
1.2	Tutorials	
1.3	Laboratory	30
1.4	Seminar	
1.5	Project	
1.7	Examination	3
Total number of contact hours with teacher:		63
2. Student's individual work		
2.1	Preparation for tutorials and tests	
2.2	Preparation for laboratory exercises, writing reports on laboratories	50
2.3	Preparation of project	
2.4	Preparation for final lecture assessment	
2.5	Preparation for examination	10
2.6	Individual study of literature	20
Total number of hours of student's individual work:		80

Overall student's workload:	143
Overall number of ECTS credits for the module	6 ECTS
Number of ECTS points that student receives in classes requiring teacher's supervision:	2.5 ECTS
Number of **ECTS** credits acquired during practical classes including laboratory exercises and projects:	1 ECTS

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

RECOMMENDED readings (all available at various internet book-shops and libraries):
A. Aczel, *Complete business statistics,* New Delhi: Mc Graw Hill, 2006;
E.W. Frees, *Data analysis using regression models - the business perspective*, Prentice-Hall Inc., 1996
W. H. Greene, *Econometric analysis*, Prentice Hall, 2002
Adams P., Smith K., Vyborny R., *Introduction to Mathematics with Maple*, World scientific Publishing Co. Ltd., 2004.
ADDITIONAL readings:
J.O. Rawlings, S.G. Pantula, D.A. Dickey, *Applied regression analysis*, Springer-Verlag, New York 2001
D. Birkes, Y. Dodge, *Alternative methods of regression*, Wiley & Sons, New York 1993

MODULE COORDINATOR (NAME, SURNAME, E-MAIL ADDRESS)

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