Zał. nr 4 do ZW

FACULTY OF PURE AND APPLIED MATHEMATICS

Name in Polish: PAKIETY STATYSTYCZNE

Name in English: Statistical Packages

Main field of study (if applicable): Applied Mathematics

Specialization (if applicable): Mathematics for Industry and Commerce

Level and form of studies: ~~1st/~~ 2nd* level, full-time / ~~part-time~~*

Kind of subject: obligatory~~-~~/ ~~optional~~ / ~~university-wide~~*

Subject code MAP2041

Group of courses YES / ~~NO~~*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		60		
Form of crediting	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course	X				
Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes	1		2		
including number of ECTS points for direct teacher-student contact (BK) classes	1,5		1,5		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student knows and can apply basic concepts of the probability theory
2. Student knows basic concepts of the mathematical statistics

SUBJECT OBJECTIVES

C1 Study of basic methods of data analysis.

C2 Acquisition of the ability to analyze data using statistical packages.

C3 Acquisition of the ability to write reports on statistical analyzes.

C4 Acquisition of skills in the English language sufficiently to enable the execution of statistical analyzes and write reports on these analyzes.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 has statistical knowledge of the relationship between the variables in the databases

PEK_W02 knows English in the statistical analysis

PEK_W03 knows methods of using statistical packages for data analysis

relating to skills:

PEK_U01 can use a statistical package for data analysis

PEK_U02 can write a report on the statistical analysis in English

relating to social competences:

PEK_K01 can translate questions about the real phenomenon on the precise mathematical language

PEK_K02 can present the results of statistical analysis in a manner understandable to non-mathematicians

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Descriptive statistics. Graphical representation of data.	2
Lec 2	Comparison of two populations - Student test, nonparametric tests.	2
Lec 3	Estimation of proportion. Chi-square goodness of fit test.	2
Lec 4	Cross tabulation. Chi-squared test of independence.	2
Lec 5	Simple linear regression - model, estimation, testing.	2
Lec 6	Simple linear regression - prediction, checking assumptions, transformations.	2
Lec 7	Test.	2
Lec 8	Multiple linear regression - estimation, testing, checking assumptions.	2
Lec 9	Multiple linear regression - analysis of variance, coefficient of determination.	2
Lec 10	Multiple linear regression - the sum of the squares, generalized linear tests.	2
Lec 11	Multiple linear regression - correlated predictors, the model selection criteria.	2
Lec 12	Univariate analysis of variance - model, estimation of parameters, testing.	2
Lec 13	Multivariate analysis of variance.	2
Lec 14	Mixed models and generalized linear model.	2
Lec 15	Test.	2
	Total hours	**30**

Form of classes - laboratory		**Number of hours**
Lab 1	Getting familiar with selected statistical package.	2
Lab 2	Descriptive statistics and graphical representation of data.	4

Lab 3	The problem of two samples - Student tests, nonparametric tests, testing normality, graphical representation of data	4
Lab 4	Tests and confidence intervals for the ratio - the proportion of a single ratio, chi-square goodness of fit test, chi-squared test of independence, graphical representation of data	4
Lab 5	Simple linear regression - estimation, prediction, power, graphical representation of data and results	4
Lab 6	Simple linear regression - diagnostics, transformations of variables	4
Lab 7	Multiple linear regression - estimation, prediction, testing, diagnosis, selection of relevant variables.	4
Lab 8	Analysis of variance - estimation, testing, comparison between groups, diagnostics	4
	Total hours	**30**

TEACHING TOOLS USED
N1. Lecture-computer presentation and traditional method. N2. Computer laboratory - an independent analysis of the data, analysis reports. N3. Consultations. N4. Student's self work – preparation for the laboratory.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_U01 PEK_K01 PEK_K02	written reports
F2	PEK_W01 PEK_U01 PEK_K01 PEK_K02	two tests
P=0,5 F1+0,5 F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] D. S. Moore, G.P. McCabe, Introduction to the Practise of Statistics
[2] M. H. Kutner, C. J. Nachstheim, J. Neter, W. Li, Applied Linear Statistical Models.

SECONDARY LITERATURE:

[1] R. Freund, R. Littell, SAS System for Regression

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
STATISTICAL PACKAGES MAP1909
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **MATHEMATICS**
AND SPECIALIZATION **MATHEMATICS FOR INDUSTRY AND COMMERCE**

Subject educational effect	**Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)****	**Subject objectives*****	**Programme content*****	**Teaching tool number*****
PEK_W01 (wiedza)	K2MIC_W02, K2MIC_W04, K2MIC_W08, K2MIC_W16	C1	Lec 1- Lec 15	1, 3
PEK_W02	K2MIC_W13	C4	Lec 1- Lec 15, Lab 1-Lab 8	1-4
PEK_W03	K2MIC_W12, K2MIC_W18	C2	Lec 1- Lec 15, Lab 1-Lab 8	1-4
PEK_U01 (umiejętności)	K2MIC_U11, K2MIC_U15, K2MIC_U20, K2MIC_U21	C2	Lec 1- Lec 15, Lab 1-Lab 8	1-4
PEK_U02	K2MIC_U02, K2MIC_U12	C3, C4	Lab 1-Lab 8	2, 3, 4
PEK_K01 (kompetencje)	K2MIC_K02	C1, C2	Lec 1- Lec 15, Lab 1-Lab 8	1-4
PEK_K02	K2MIC_K05	C3, C4	Lab 1-Lab 8	2, 3, 4

** - from table above