FACULTY OF ELECTRICAL ENGINEERING

SUBJECT CARD

Name in Polish:	**Statystyka stosowana**
Name in English:	**Applied Statistics**
Main field of study (if applicable):	**Electrical Engineering**
Specialization (if applicable):	
Level and form of studies:	**1st level, full-time**
Kind of subject:	**obligatory / university-wide**
Subject code:	**MAT001501**
Group of courses:	**NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30				
Number of hours of total student workload (CNPS):	90				
Form of crediting:	crediting with grade				
For group of courses mark (X) final course:					
Number of ECTS points:	3				
including number of ECTS points for practical (P) classes :					
including number of ECTS points for direct teacher-student contact (BK) classes:	2.10				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge and skills in mathematical analysis.
2. Knowledge of basic concepts of probability theory equivalent to high school certificate at the basic level.

SUBJECT OBJECTIVES

C1. Introduction to basic ideas of probability theory and their applications in mathematical modeling.
C2. Presentation of the basic methods of descriptive and graphical analysis of empirical data.
C3. Presenting approaches used to build statistical models along with necessary assumptions.
C4. Transfer of knowledge on selecting procedures and computational algorithms for specified statistical analysis tasks.

SUBJECT LEARNING OUTCOMES

relating to knowledge:

PEU_W01	has basic knowledge on modeling random phenomena and the use of probabilistic models,
PEU_W02	knows construction of basic descriptive statistics and corresponding algorithms for their computation,
PEU_W03	knows the estimation methods used in basic parametric and nonparametric models, knows the significance tests for the parameters of basic parametric models as well as the nonparametric tests and the F test used in analysis of variance, has basic knowledge on statistical analysis of the relationship between quantitative variables,

relating to skills:

relating to social competences:

PEU_K01	understands the need for systematic and independent work on mastery of course material

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours:**
Lec 1	Probability space. The axiomatic definition of probability.	2
Lec 2	Conditional probability. Independence of events.	2
Lec 3	Discrete random variables. Parameters of discrete random variables. Binomial and Poisson distributions.	2
Lec 4	Continuous random variables. Parameters of continuous random variables. Uniform, normal and exponential distributions.	2
Lec 5	Standardisation of a random variable. Tables of the standard normal distribution. Independence of random variables.	2
Lec 6	Two-dimensional random variables. Regression curve. Correlation coefficient.	2
Lec 7	Basic ideas of mathematical statistics, empirical moments, histogram.	2
Lec 8	Point estimation. Unbiasedness and consistency of estimators. Maximum likelihood estimation.	2
Lec 9	Confidence intervals for mean, variance and proportion.	2
Lec 10	Testing statistical hypotheses. Type I and type II errors.	2
Lec 11	Tests for mean and two-sample test for equal means.	2
Lec 12	Nonparametric tests. Chi-square goodness of fit test and chi-square test for independence.	2
Lec 13	One-way analysis of variance.	2
Lec 14	Simple linear regression. Calculation of a regression line (method of least-squares). Analysis of residuals, prediction.	2
Lec 15	Test.	2
	Total hours:	**30**

TEACHING TOOLS USED
N1. Lecture - traditional method or using multimedia tools.
N2. Lists of problems.
N3. Student's own work.
N4. Tutorial.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation *F – forming (during semester)* *P – concluding (at semester end)*	**Educational effect number**	**Way of evaluating educational effect achievement**
F1(W)	PEU_W01 PEU_W02 PEU_W03 PEU_K01	Test
P(W)	P=F1	

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
[1] J. Koronacki, J. Mielniczuk, Statystyka dla studentów kierunków technicznych i przyrodniczych, WNT, Warszawa 2004. [2] L. Gajek, M. Kałuszka, Wnioskowanie statystyczne. Modele i metody. WNT, Warszawa 2004. [3] J. Greń, Statystyka matematyczna. Modele i zadania, PWN, Warszawa 1976. [4] H. Jasiulewicz, W. Kordecki, Rachunek prawdopodobieństwa i statystyka matematyczna. Przykłady i zadania. GiS, Wrocław 2001. [5] W. Krysicki, J. Bartos, W. Dyczka, K. Królikowska, M. Wasilewski, Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach, Cz. I-II, PWN, Warszawa 2007.
SECONDARY LITERATURE:
[1] T. Inglot, T. Ledwina, Z. Ławniczak, Materiały do ćwiczeń z rachunku prawdopodobieństwa i statystyki matematycznej, Wydawnictwo Politechniki Wrocławskiej, Wrocław 1984. [2] W. Klonecki, Statystyka matematyczna, PWN, Warszawa 1999. [3] W. Kordecki, Rachunek prawdopodobieństwa i statystyka matematyczna. Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS, Wrocław 2002. [4] A. Plucińska, E. Pluciński, Zadania z probabilistyki, PWN, Warszawa 1983. [5] A. Stanisz, Przystępny kurs statystyki, Kraków 1998.

SUBJECT SUPERVISOR
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