

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. Ability to apply the fundamental concepts of mathematical analysis.
2. The knowledge of probability theory required by the ordinary level of the mathematics examination for the school leaver's certificate .

**SUBJECT OBJECTIVES**

- C1. Students will gain an understanding of the fundamental concepts of probability theory and its application to mathematical modeling.  
 C2. Students will gain the ability to describe empirical data using descriptive statistics and graphical methods.  
 C3. Students will be able to formulate simple statistical models and state their assumptions.  
 C4. Students will be able to apply appropriate mathematical procedures and algorithms to specified statistical problems.

**SUBJECT EDUCATIONAL EFFECTS***relating to knowledge:*

- PEK\_W01 Students will gain fundamental knowledge of modeling random phenomena and applying probabilistic models.  
 PEK\_W02 Students will learn the form of basic descriptive statistics and methods of calculating them.  
 PEK\_W03 Students will learn methods of estimation used for fundamental parametric and non-parametric models, will learn to apply parametric and non-parametric significance tests, as well as the F test for the difference between variances, will learn how to analyze the dependency between numerical variable

*relating to skills:**relating to social competences:*

- PEK\_K01 Students will be able to find and use the appropriate literature for this course, as well as independently gaining knowledge

PROGRAMME CONTENT		
Form of classes - lecture		Number of hours:
Lec 1	Probability spaces. Axiomatic definition of probability.	2
Lec 2	Conditional probability. Independent events.	2
Lec 3	Discrete random variables. Parameters of the distribution of a discrete random variable. Binomial and Poisson distributions.	2
Lec 4	Continuous random variables. Parameters of the distribution of a continuous random variable. Uniform, exponential and normal distributions.	2
Lec 5	Standardization of a random variable. Tables for the normal distribution. Independent random variables.	2
Lec 6	Bivariate random variables. Regression curve. Correlation coefficient.	2
Lec 7	Fundamental concepts of statistical theory, empirical moments, histogram.	2
Lec 8	Point estimation. Unbiased and consistent estimators. Maximum likelihood estimation.	2
Lec 9	Confidence intervals for mean, variance and a proportion.	2
Lec 10	Statistical testing. Type I and II errors.	2
Lec 11	Tests for a mean and the difference between two means.	2
Lec 12	Non-parametric tests. Chi-square tests of independence and goodness of fit.	2
Lec 13	One-way analysis of variance.	2
Lec 14	Univariate linear regression. Deriving regression lines using the least squares method. Analysis of residuals, forecasting.	2
Lec 15	Test	2
Total hours:		<b>30</b>

TEACHING TOOLS USED
N1. Lecture- traditional form N2. Problems list. N3. Consultation hours. N4. Students' study - additional exercises and preparation for the test.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
<b>Evaluation</b> <i>F - forming (during semester)</i> <i>P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEK_W01 PEK_W02 PEK_W03 PEK_K01	Test
P(w)	P=F1	

PRIMARY AND SECONDARY LITERATURE
<b>PRIMARY LITERATURE:</b> [1] J. Koronacki, J. Mielniczuk, Statystyka dla studentów kierunków technicznych i przyrodniczych, WNT, Warszawa 2004. [2] L. Gajek, M. Kałuska, 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. Kryszewski, J. Bartos, W. Dyczka, K. Królikowska, M. Wasilewski, Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach, Cz. I-II, PWN, Warszawa 2007.
<b>SECONDARY LITERATURE:</b> [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 probablistyki, PWN, Warszawa 1983. [5] A. Stanisław, Przystępny kurs statystyki, Kraków 1998.

SUBJECT SUPERVISOR
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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT  
**MAT001501 - Applied Statistics**  
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**

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	K1ETK_W06	C.1	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6	N.1 N.2 N.3 N.4
PEK_W02	K1ETK_W06	C.2 C.3	Lec7	N.1 N.2 N.3 N.4
PEK_W03	K1ETK_W06	C.2 C.3 C.4	Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14	N.1 N.2 N.3 N.4
PEK_K01	K1ETK_K04	C.1 C.2 C.3 C.4	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.3 N.4