

KARTA PRZEDMIOTU**Statystyczna Analiza Danych - Dr M. Nowak-Kępczyk****I. Dane podstawowe**

Nazwa przedmiotu	Statystyczna Analiza Danych
Nazwa przedmiotu w języku angielskim	Statistical Analysis of Data
Kierunek studiów	Informatyka, matematyka
Poziom studiów (I, II, jednolite magisterskie)	I
Forma studiów (stacjonarne, niestacjonarne)	stacjonarne
Dyscyplina	MATEMATYKA, INFORMATYKA
Język wykładowy	ANGIELSKI

Koordinator przedmiotu/osoba odpowiedzialna	dr Małgorzata Nowak-Kępczyk
---	-----------------------------

Forma zajęć (<i>katalog zamknięty ze słownika</i>)	Liczba godzin	semestr	Punkty ECTS
wykład	30	2 or 4 or 6	5
konwersatorium			
ćwiczenia	30	2 or 4 or 6	
laboratorium			
warsztaty			
seminarium			
proseminarium			
lektorat			
praktyki			
zajęcia terenowe			
pracownia dyplomowa			
translatorium			
wizyta studyjna			

Wymagania wstępne	Elements of calculus. Basics of probabilistic methods.
-------------------	--

II. Cele kształcenia dla przedmiotu

C1. The main aim of the course is to familiarize students with the methods and procedures of descriptive statistics and mathematical statistics.
C2. Students will get acquainted with the basic methods and objectives of descriptive statistics, such as the use of statistical measures, charts and methods of statistical inference, such as estimation and statistical testing principles.

III. Efekty uczenia się dla przedmiotu wraz z odniesieniem do efektów kierunkowych

Symbol	Opis efektu przedmiotowego	Odniesienie do efektu kierunkowego
WIEDZA		
W_01	The student understands the importance of mathematics and its applications, in particular, its role in the context of contemporary civilization dilemmas.	K_W01
W_02	The student has advanced knowledge of the basic areas of higher mathematics, in particular in statistics and other selected fields of mathematics and its applications.	K_W04
UMIEJĘTNOŚCI		
U_01	The student can employ statistical characteristics of population and their sample analogues	K_U35
U_02	The student is able to use his knowledge to formulate complex and unusual mathematical problems in a correct and understandable way, discuss them and the methods of solving them and present mathematical results and contents, in particular using information and communication techniques.	K_U38
U_03	The student can determine parameters of distribution of random variable with discrete or continuous distribution; can apply limit theorems and laws of large numbers to estimate probabilities.	K_U33
KOMPETENCJE SPOŁECZNE		
K_01	The student is prepared to appreciate the role and importance of knowledge in solving cognitive and practical problems, typical of occupations and workplaces appropriate for graduates in the field of mathematics/informatics and consulting experts in the case of difficulties in solving the problem	K_K02
K_02	Student is ready to present selected achievements of higher mathematics in a popular way.	K_K05

IV. Opis przedmiotu/ treści programowe

<ol style="list-style-type: none"> 1. Main goals, advantages and disadvantages of statistics - examples of statistical problems, basic definitions (population, sample, random variable), measurement scales. 2. Basic statistical concepts - empirical distribution, data series, time series, types of data, quantity, cumulative quantity. 3. Measurements of descriptive statistics - average, median, quartiles, quintiles, standard deviation, variance, range. Other measures of descriptive statistics. 4. Statistical charts - histogram, side-and-must chart, pie chart, line chart, other charts. 5. Review of some distributions of random variables - discrete distributions and continuous distribution (binomial distribution, Poisson distribution, normal distribution, exponential distribution, Student's t-distribution). 6. Estimation - point estimation, estimator features, moment method, estimation of the maximum probability, methods and examples of interval estimation. 7. Statistical tests - the concept of zero hypothesis, alternative hypothesis, level of significance, types of errors, critical value. An example of statistical test tonnage. 8. Selected examples of statistical tests (chi-square tests, tests of means, Kolmogorov-Smirnov test, etc.). 9. Introduction to multidimensional analysis, concept of variable dependencies (covariance and correlation coefficient). Basics of regression analysis (linear and nonlinear). 10. Time series - smoothing time series, dynamics indicators. Discussion on the basics of forecasting time
--

series.

11. Introduction to simulation methods - Monte Carlo method and its application.

V. Metody realizacji i weryfikacji efektów uczenia się

Symbol efektu	Metody dydaktyczne <i>(lista wyboru)</i>	Metody weryfikacji <i>(lista wyboru)</i>	Sposoby dokumentacji <i>(lista wyboru)</i>
WIEDZA			
W_01	Problem lecture	Test, written test, written exam.	Evaluated test.
W_02	Conventional lecture	Test, written test, written exam.	Evaluated test.
W_...			
UMIEJĘTNOŚCI			
U_01	Guided practice	Test.	Evaluated test.
U_02	Guided practice	Test, written test, written exam.	Evaluated test.
U_03	Guided practice	Test, written test, written exam.	Evaluated test.
KOMPETENCJE SPOŁECZNE			
K_01	Conversational lecture	Test, written test, written exam.	Evaluated test.
K_02	Group work, work in pairs	Test, written test, written exam.	Evaluated test.
K_...			

LECTURE

The completion of classes is required.

Based on written exam:

86 – 100% (5,0)

76 – 85% (4,5)

66 – 76% (4,0)

60 – 65% (3,5)

50 – 59% (3,0)

less than 50% (2,0)

CLASSES:

80% of attendance is required.

Final grade based on two tests:

86 – 100% (5,0)

76 – 85% (4,5)

66 – 76% (4,0)

60 – 65% (3,5)

50 – 59% (3,0)

less than 50% (2,0)

The detailed description of assessment is given during the lecture/classes.

VI. Obciążenie pracą studenta

Forma aktywności studenta	Liczba godzin
Liczba godzin kontaktowych z nauczycielem	90
Liczba godzin indywidualnej pracy studenta	60

VII. Literatura

Literatura podstawowa
1) William Mendenhall, Robert J. Beaver, Barbara M. Beaver "Introduction to Probability and Statistics"
2) David Freedman, Robert Pisani, Roger Pruves "Statistics" Viva Books, 2011
3) Andrzej Stanis, "Przystępny kurs statystyki", Kraków 2001
4) Amir D. Aczel "Complete business statistics" Wohl Publishing; 8th edition (2012)
Literatura uzupełniająca
1) Starzyńska W., Statystyka praktyczna. Wydawnictwo naukowe PWN, Warszawa 2002 i wydania późniejsze
2) Ostasiewicz S., Rusnak Z., Siedlecka U., Statystyka. Elementy teorii i zadania. Wydanie 4, poprawione. Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław 2001.
3) Sobczyk M., Statystyka. PWN, Warszawa 2001 i późniejsze wydania.
4) Roxy Peck, Chris Olsen, Jay Devore "Introduction to Statistics and Data Analysis" Cengage Learning, Jan 1, 2011