Course Syllabus

I.   **General Information**

Course name	DESCRIPTIVE STATISTICS
Programme	MATHEMATICS
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	BA
Form of studies (full-time, part-time)	full-time
Discipline	MATHEMATICS
Language of instruction	english

Course coordinator/person responsible	dr Kamil Powroźnik

Type of class *(use only the types mentioned below)*	Number of teaching hours	Semester	ECTS Points
lecture	30	VI	5
tutorial			
classes	30	VI	
laboratory classes			
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	Knowledge of basic mathematics and elementary arithmetic operations.

II.   **Course Objectives**

1. To familiarise students with the methods and procedures of descriptive statistics.
2. To develop students' skills in presenting and analysing statistical data and drawing appropriate conclusions.

III.   Course learning outcomes with reference to programme learning outcomes

Symbol	Description of course learning outcome	Reference to programme learning outcome
KNOWLEDGE		
W_01	The student understands the importance of descriptive statistics and its applications, in particular its role in the context of the dilemmas of modern civilisation.	K_W01
W_02	The student has advanced knowledge of selected concepts and theorems constituting the descriptive statistics and its applications.	K_W04
SKILLS		
U_01	The student is able to use his knowledge of descriptive statistics to formulate complex and non-typical mathematical problems in a correct and comprehensible way, discuss them and methods of solving them, and present mathematical results and contents, in particular using information and communication techniques.	K_U37
U_02	The student can present statistical data in tabular and graphic forms, calculate basic statistical measures for these data, analyse the obtained results and interpret them.	K_U37
SOCIAL COMPETENCIES		
K_01	The student is prepared to appreciate the role and importance of knowledge in solving problems of cognitive and practical nature, typical for the professions and workplaces characteristic for graduates in the field of mathematics and consulting experts in the case of difficulties in solving the problem.	K_K02
K_02	The student is prepared to present selected developments in descriptive statistics to the layperson in a popular manner.	K_K05

IV.   Course Content

1. The concept, functions, aims and importance of descriptive statistics. Applications of descriptive statistics in other fields of science.
2. Basic concepts in statistics such as general population, sample, statistical data. Statistical characteristics: qualitative and quantitative, discrete and continuous.
3. Measurement scales.
4. Statistical survey - objectives and stages. Errors in statistical research.
5. Forms of presentation of statistical material: tabular and graphic. Construction of point and interval series. Histogram and other graphs.
6. Measures of central tendency: mean, dominant, quantiles, and others.
7. Measures of variability: variance, standard deviation, quarter deviation, coefficient of variation, typical area of variation and others.
8. Measures of asymmetry.
9. Measures of concentration.
10. Basic information about normal distribution. Standardisation. The 3 sigma rule. Empirical distribution and its types.
11. The issue of correlation. Pearson's linear correlation coefficient. Spearman's rank correlation

coefficient.
12. The issue of regression. Linear regression. Linear trend. Examples of non-linear models.
13. Verification of the fit of the regression model to empirical data.
14. Description of the dynamics of phenomena. Time series. Measures of dynamics: increments, individual and aggregate indices, rate of change, and others.

V.   Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods *(choose from the list)*	Forms of assessment *(choose from the list)*	Documentation type *(choose from the list)*
KNOWLEDGE			
W_01	Conventional lecture, guided practice	Exam, written test	Evaluated written exam, evaluated written test, protocol
W_02	Conventional lecture, guided practice	Exam, written test	Evaluated written exam, evaluated written test, protocol
SKILLS			
U_01	Practical classes, guided practice	Exam, written test	Evaluated written exam, evaluated written test, protocol
U_02	Practical classes, guided practice	Exam, written test	Evaluated written exam, evaluated written test, protocol
SOCIAL COMPETENCIES			
K_01	Discussion, practical classes	Exam, written test	Evaluated written exam, evaluated written test
K_02	Discussion, practical classes	Exam, written test	Evaluated written exam, evaluated written test

VI.   Grading criteria, weighting factors.....

Specific grading policies are given to students in the first class.

Credit of the lecture:
Examination in written form (for students who have obtained credit from classes).
The examination grade is given according to the following rules:
[90%-100%] of points - very good (5),
[80%,90%) - good plus (4.5),
[70%,80%) - good (4),
[60%,70%) - sufficient plus (3.5),
[50%,60%)- satisfactory (3),
below 50% - unsatisfactory (2).

Credit for classes:
Two written tests using computer tools to analyse statistical material (e.g. Excel, SPSS).
Final grade is given according to the following rules:
[90%-100%] of points - very good (5),

[80%,90%) - good plus (4.5),

[70%,80%) - good (4),

[60%,70%) - sufficient plus (3.5),

[50%,60%) - satisfactory (3),

below 50% - unsatisfactory (2).

VII.   Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	*90*
Number of hours of individual student work	*60*

VIII.   Literature

Basic literature
1. Z. Holcomb, „Fundamentals of Descriptive Statistics", Routledge, 1997.
2. Chapter 2 „Descriptive Statistics" in D.S. Shafer, Z. Zhang „Beginning Statistics".
3. J. Nicholas, „Introduction to Descriptive Statistics", University of Sydney, 2006.
4. Notes from the lectures.
Additional literature
1. D. Freedman, R. Pisani, R. Pruves, "Statistics", W W Norton & Co Inc.