COURSE DESCRIPTION CARD - SYLLABUS

Course name
Descriptive statistics [S1MwT1>SO]

Course

Field of study
Mathematics in Technology

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

Lecturers

dr hab. inż. Katarzyna Filipiak prof. PP
katarzyna.filipiak@put.poznan.pl

dr Kamila Tomaszyk
kamila.tomaszyk@put.poznan.pl

Prerequisites

Basic knowledge of elementary functions, algebraic operations, mathematical analysis and probability theory. Computer skills: MS Office environment knowledge (especially MS Excel) or Libre Office.

Course objective

Descriptive statistics are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data.

Course-related learning outcomes

Knowledge:
• students understand the meaning of descriptive statistics and their applications in other sciences;
• students know how to use descriptive statistics methods in a making of analysis the data;
• students know about calculating and programming techniques involved in descriptive statistics me-

thods and understand their boundary.

Skills:
• students are able to formulate the aim, the subject and the range of the statistics;
• students are able to present the results of the research;
• students are able to use the proper statistical methods in order to make the analysis of the data;
• students are able to make the quantitative analysis and to formulate the proper corollaries about studied phenomena;
• students are able to learn by themselves.

Social competences:
• students understand the need of the further education and the developing of their skills;
• students are able to define the priorities properly;
• students understand the social aspects of the practical using of the knowledge and the connected with them responsibility;
• students are able to act in the enterprising way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lectures: written final exam on the last lecture;
Laboratory classes: one test on the last laboratory.

Programme content

Update: 01.09.2022r.
APPLIED METHODS OF TEACHING: lectures – a slide show with examples written on the blackboard; laboratory – discussion on solved problems (using eg. free software).
PRELIMINARIES (populations, observations and samples, statistical characteristics and their classification, measure scales).
STATISTICAL RESEARCH STAGES (aim, subject and space of statistical research, statistical observations and samples, statistical series and their types, statistical tables, graphs – histograms, boxplot, box-and-whisker plot).
MEASURES OF CENTRAL TENDENCY (outliers, arithmetic mean (AM), geometric mean (GM), harmonic mean (HM), relationship between AM, GM and HM, mode, median, quartiles, other quantiles).
MEASURES OF DISPERSION (average deviation, variance, standard deviation, classic coefficient of variation, range, interquartile range, interquartile deviation, order coefficient of variation).
MEASURES OF SKEWNESS (negative skew, positive skew, measures of skewness, coefficient of asymmetry, central moments of third order, sample skewness).
MEASURES OF CONCENTRATIONS (kurtosis,excess, Gini coefficient of concentration, Lorenz curve).
MEASURES OF CORRELATION FOR TWO VARIABLES (correlation series, correlation diagram, correlation
table, covariance, Pearson’s correlation coefficient, Spearman’s rank correlation coefficient).
REGRESSION ANALYSIS (linear regression model, least squares method, nonlinear regression, multiple regression).

Teaching methods

Lectures:
• theory presented in relation to the current knowledge of students;
• frequent initiating discussions during the lecture;
• recommending materials for self-expanding knowledge.
Laboratory classes:
• tasks closely related to the theory presented during the lecture;
• solving sample tasks in Excel;
• detailed discussion of solved tasks.

Bibliography

Basic

1. G.A.F. Seber, A. J. Lee, Linear regression analysis. John Wiley and Sons, 2003 (Mg 179960)
2. R. Johnson, Elementary statistics. Boston: Duxbury Press, 1984 (Mg 190139)
3. E. Wasilewska, Statystyka opisowa od podstaw. Podręcznik z zadaniami. Wydawnictwo SGGW, 2015.
4. E. Wasilewska, Statystyka matematyczna w praktyce. Wydawnictwo Difin, 2015. (księg. stud. E1, W 157580)
5. I. Bąk, I. Markowicz, M. Mojsiewicz, K. Wawrzyniak, Statystyka opisowa : przykłady i zadania. Wydawnictwo: CeDeWu, Warszawa 2015. (księg. stud. A2, W 157584)
6. W. Starzyńska, Statystyka praktyczna. Wydawnictwo Naukowe PWN, Warszawa 2012. (księg. stud. A2, W 146547)
7. M. Iwińska, B. Popowska, M. Szymkowiak, Statystyka opisowa. Wydawnictwo Politechniki Poznańskiej, 2011. (księg. stud. E1, W 130794)
8. J. Buga, H. Kassyk-Rokicka, Podstawy statystyki opisowej. Wydawnictwo: Vizja Press & IT, Warszawa 2008. (księg. stud. A2, W 119664)
9. M. Sobczyk, Statystyka. Wydawnictwo Naukowe PWN, Warszawa (1998 – księg. stud. A2, W 146934; 2007 - czytelnia)
Additional
1. A. Witkowska, M. Witkowski, Statystyka opisowa w przykładach i zadaniach. Wydawnictwo Uczelni Państwowej Wyższej Szkoły Zawodowej im. Prezydenta Wojciechowskiego, Kalisz 2007. (księg. stud. A2, W 123957)
2. W. Regel, Ćwiczenia z podstaw statystyki w Excelu. Wydawnictwo Naukowe PWN, Warszawa 2007. (księg. stud. A2, W 121127)
3. A. Aczel, Statystyka w zarządzaniu : pełny wykład (przekł.: Zbigniew Czerwiński, Wojciech Latusek). Wydawnictwo Naukowe PWN, Warszawa 2006. (księg. stud. A3, W 90872)

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	33	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	27	1,00