

FACULTY OF CHEMISTRY

SUBJECT CARD**Name of subject in Polish:** Zaawansowana analiza danych eksperymentalnych**Name of subject in English:** Advanced analysis of experimental data**Main field of study (if applicable):** Chemical Engineering and Technology**Specialization (if applicable):****Profile:** practical**Level and form of studies:** 2nd level**Kind of subject:** optional**Subject code** W03CET-SM2102C**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)		50			
Form of crediting (Examination / crediting with grade)		Crediting with grade			
For group of courses mark (X) final course					
Number of ECTS points		2			
including number of ECTS points for practical classes (P)		2			
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)		1,2			

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of academic courses: mathematical analysis and linear algebra
2. Knowledge of the basics of statistics
3. Knowledge of Excell
4. Knowledge of the principles of presentation of results

SUBJECT OBJECTIVES

- C1. To indicate the principle of correct elaboration and presentation of research and experimental results
- C2. To learn advanced statistical methods
- C3. To learn the practical application of linear regression and correlation
- C4. To learn the principles of using optimization plans in process optimization
- C5. To acquire the ability to analyze normality of distribution and homogeneity of variance.
- C6. To learn the practical application of correlation

C7. To learn the methods of analyzing the significance of statistical differences and their interpretation

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEU_W01 - The student defines the basic concepts of statistics

PEU_W02 - The student knows the principles, objectives and stages of results analysis

PEU_W03 - Student knows the statistical tests that allow to reject extreme results with large measurement error

PEU_W04 - Student knows the principles of using linear regression analysis

PEU_W05 - Student knows the principles of determining normality distribution, homogeneity of variance

PEU_W06 - Student knows methods of correlation determination

PEU_W07 - Student knows statistical tests that allow to determine statistically significant differences.

Relating to skills:

PEU_U01 - The student correctly interprets and presents the results

PEU_U02 - Student is able to reject erroneous results

PEU_U03 - The student is able to apply linear regression

PEU_U04 - The student is able to determine normality of the distribution of results and assess homogeneity

PEU_U05 - Student can determine the relationship between results by using correlation

PEU_U06 - Student can determine the presence of statistically significant differences

PEU_U07 - Student can select and apply appropriate statistical tests to assess the significance of statistical differences

Relating to social competences:

PEU_K01 - The student is aware of the need to analyze and process the results

PEU_K02 - The student is aware of the need to interpret the results and look for relationships between them

PROGRAMME CONTENT

Classes		Number of hours
CI 1	Introductory classes. Introduction to statistical processing of results. Significant digits. Measurement error. Graphical presentation of results.	3h
CI 2	Rejection of extreme results.	3h
CI 3	Linear regression.	3h
CI 4	Determination of optimal parameters.	3h
CI 5	Test 1	3h
CI 6	Analysis of normality of distribution and homogeneity of variance.	3h
CI 7	Correlations	3h
CI 8	Statistically significant differences - comparison of two groups	3h
CI 9	Statistically significant differences - comparison of more than two groups	3h
CI 10	Test 2	3h

	Total hours	30h
TEACHING TOOLS USED		
N1. Multimedia presentation N2. Computer software - Excel and Statistica N3. Case study N4. Working with the results N5. Problem-based lecture N6. Own work		

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01-W04, PEU_U01-U03 PEU_K01-K02	Test 1
F2	PEU_W04-W07 PEU_U04-U07 PEU_K01-K02	Test 2

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] Frost J.: Introduction to Statistics: An Intuitive Guide for Analyzing Data and Unlocking Discoveries, 2020
- [2] Frost J.: Regression Analysis: An Intuitive Guide for Using and Interpreting Linear Models, 2020
- [3] Carlberg C.: Statistical Analysis: Microsoft Excel, 2017
- [4] de Smith M.: Statistical Analysis Handbook, 2018

SECONDARY LITERATURE:

- [1] Cowan G.: Statistical Data Analysis (Oxford Science Publications), 1997
- [2] www.statsoft.pl

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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