FACULTY OF CHEMISTRY

SUBJECT CARD

Name of subject in Polish: Analiza statystyczna danych eksperymentalnych
Name of subject in English: Statistical analysis of experimental data
Main field of study (if applicable): Chemical and process engineering
Specialization (if applicable): Advanced Chemical Engineering and Nanotechnology
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code: MAC024022
Group of courses: NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15				
Number of hours of total student workload (CNPS)	60				
Form of crediting	crediting with grade				
For group of courses mark (X) final course					
Number of ECTS points	2				
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	0,5				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basics of theory of probability.
2. Basics of calculus.
3. Good knowledge of international system of units (SI).

SUBJECT OBJECTIVES

C1 . Quantitative estimation of quality of a direct measurement.
C2 . Quantitative estimation of evaluation quality for an direct value.
C3. Understanding of quality of statistical description of experimental data.
C4 . Understanding of basic ideas of statistical comparisons of measurements.
C5. Analysis of degree of correlation between variables.
C6. Statistical adjustment of experimental curves.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:
After the classes, a student knows:
PEK_W01 – what are the types, sources, and methods of determination of experimental uncertainties;
PEK_W02 – how to choose and calculate meaningful means, and evaluate the limits of dispersion of experimental results,
PEK_W03 – what is the relations between correlation and regression analysis of data,
PEK_W04 – what are the common principle of statistical tests,
PEK_W04 – how to choose and run tests of comparison of two or more experimental values,
PEK_W05 – how to choose and run simple non-parametric tests,
PEK_W06 – how to estimate the parameters of regression lines, and the confidence limits for regression curve.

Relating to skills:
After the classes, a student knows:
PEK_U01 – how to estimate the uncertainties of direct measurements,

PEK_U02 – how to calculate the uncertainties on indirect measurements,
PEK_U03 – how to estimate the parameters of regression lines and how to linearise non-linear laws.

Z zakresu kompetencji społecznych:

After the classes, a student knows:
PEK_K01 – how to appreciate the quality of an experimental result ;
PEK_U02 – how to critically evaluate the veracity of statistical analysis of any data.

PROGRAMME CONTENT **Lectures**		**Liczba godzin**
Lec1	Measurables: directs, undirects. Uncertainty: absolute, relative, type A and type B. Determination of experimental uncertainty for direct measures.	2
Lec2	Propagation of errors	2
Lec3	Descriptive statistics: type of means, variance, standard deviation.	2
Lec4	Correlation.	2
Lec5	Regression (linear). Linearisataion of non-linear laws.	2
Lec6	Principle of statistical tests. Basic non-parametric test: khi2.	2
Lec7	Parametric tests: comparison of frequencies and means.	2
Lec8	Non parametric tests. Tests on ranks.	1
	Total contact hours	**15**

TEACHING TOOLS USED

N1. Presentation of essential theoretical information (diaporama)
N2. PBL (problem based learning) – metrological analysis of laboratory results.
N3. Continuous (weekly) verification of progress.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_U01 - U03	Weekly interrogations
P	PEK_W01-W06, PEK_U01 - U03	Final MCT

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Michael Sullivan „Fundamentals of statistics”
[2] H.Szydlowski “Teoria pomiarow” (in Polish)

SECONDARY LITERATURE:

OPIEKUN PRZEDMIOTU (IMIĘ, NAZWISKO, ADRES E-MAIL)

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