Zał. nr 5 do ZW 78/2023

Attachment no. 4. to the Program of Studies

FACULTY of Chemistry

SUBJECT CARD

Name of subject in Polish METODY MATEMATYCZNE W PLANOWANIU I ANALIZIE EKSPERYMENTU

Name of subject in English MATHEMATICAL METHODS IN PLANNING AND ANALYSIS OF EXPERIMENT

Main field of study (if applicable): Advanced Nano and Biomaterials - MONABIPHOT

Specialization (if applicable):

Profile: academic

Level and form of studies: 2nd level, full-time

Kind of subject: obligatory

Subject code W03ANB-SM2007L

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)			60		
Form of crediting (Examination / 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)			1,4		

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. General physics
2. General chemistry

SUBJECT OBJECTIVES

C1 The aim of the subject is to familiarize students with the experimental data analysis
C2 Familiarizing the student with the methods of data analysis
C3 Acquiring the ability to carry out the data analysis process

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 Has basic knowledge of selecting and fitting a mathematical model to experimental data.

PEU_W02 Obtains knowledge about authorized inference methods.

PEU_W03 Has knowledge of the chemical and physical characteristics of materials and their impact on their functional properties

relating to skills:

PEU_U01 Is able to calculate the electrical, optical, magnetic and mechanical properties of polymers using a computer program.

PEU_U02 Is able to conduct literature research on a specific scientific and research problem. Has basic skills in planning and conducting scientific research.

PEU_U03 Is able to conduct scientific experiments, develop and interpret their results and relate them to appropriate theories or scientific hypotheses. Is able to determine directions for further learning and implement the self-education process. Is able to apply the principles of safe work in a chemical laboratory.

PROGRAMME CONTENT

	Laboratory	**Number of hours**
Lab 1	Planning experiments	2
Lab 2	Selection of experimental methods	2
Lab 3	Computer data analysis - Origin, ImageJ	2
Lab 4	Computer data analysis - Python	2
Lab 5	Descriptive statistics	2
Lab 6	Statistical hypotheses	2
Lab 7	The use of a statistical description	2
Lab 8	Integral methods	2
Lab 9	Differential methods	2
Lab 10	Signal filtration	2
Lab 11	Image analysis - part 1	2
Lab 12	Image analysis - part 2	2
Lab 13	Image analysis - part 3	2
Lab 14	Review of experimental methods	2
Lab 15	Review of experimental methods	2
	Sum of hours	30

TEACHING TOOLS USED

N1. Performing tasks in the laboratory
N2. Computer / computer program / programming

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P –	Learning outcomes code	Way of evaluating learning outcomes achievement

concluding (at semester end)		
P	PEU_W01-W03, PEU_U01-U03	Project evaluation from analysis of experimental data

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Alistair Croll, Benjamin Yoskovitz, „Lean Analytics: Use Data to Build a Better Startup Faster", "O'Reilly Media, Inc.", 2013

[2] Viktor Mayer-Schönberger, "Big Data : a Revolution that Will Transform how We Live, Work, and Think", Mariner Books, Houghton Mifflin Harcourt, 2013

[3] Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Ipython", O'Reilly Media, Incorporated, 2017

SECONDARY LITERATURE:

[1] Original scientific articles available through electronic literature database of Main Library of WUST

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

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