



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Statistical processing of measurement data [S1TOZ1>SODP]

Course

Field of study

Circular System Technologies

Year/Semester

1/2

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

0

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

30

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Mathematics knowledge needed to solve problems related to statistics and chemometrics. The ability to obtain information from literature, databases and other sources related to chemical sciences, the ability to interpret them, draw conclusions and formulate opinions. Basic knowledge of how to use an Excel spreadsheet.

Course objective

Gaining knowledge of fundamentals of statistical data analysis.

Course-related learning outcomes

Knowledge:

1. student has knowledge of mathematics to the extent that allows him to use mathematical methods to describe chemical processes and make calculations needed in engineering practice [k_w01].

Skills:

1. student can obtain information from literature, databases and other sources related to circular system technologies, including in a foreign language, integrate it, interpret it and draw conclusions and

formulate opinions [k_u01].

2. student uses computer programs that support the implementation of tasks typical for circular system technologies [k_u02].

3. student can interact with others within the framework of work on circular system technologies and of an interdisciplinary nature [k_u09].

Social competences:

1. student shows independence and inventiveness in individual work, as well as effective cooperation in a team, playing different roles in it; objectively assesses the effects of own and team members' work [k_k02].

2. student assesses objectively his/her level of knowledge and skills, understands the importance of improving professional and personal competences in accordance with changing social conditions and learning progress [k_k05].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Partial tests.

In the case of stationary classes, credit for projects is given in the computer lab, while in the case of online classes, credit is given using the university's network and computer infrastructure (VPN) through the Remote Desktop Protocol (RDP) with the use of a remote desktop connection tool. In case of the exam, the credit is given online using the platform ekursy.put.poznan.pl in the form of a test.

Programme content

Within the project activities, students perform tasks related to the use of basic statistical concepts to solve real chemical problems.

Course topics

Within the project activities, students perform tasks related to the use of basic statistical concepts to solve real chemical problems that they may encounter in the laboratory work, e.g. study of the arithmetic mean distribution, calculation of the basic statistical characteristics of the sample, confidence interval for the expected value, creating a histogram. In addition, students carry out tests of equality of variance of two samples, equality of the expected values, determine the linear regression equation, examine the significance of the linear correlation, the significance of the intercept and compare the value of the slope coefficient with the standard, check the tolerance range of values deviating from the determined model, use linearized regression and approximation with a polynomial. As part of the tutorials, students solve tasks using an Excel spreadsheet, learn about the operation and basic functions of the Statistica program.

Teaching methods

Theoretical introduction, discussion, joint discussion of problems related to statistical issues, independent task solving.

Bibliography

Basic

1. W. Ufnalski, Excel dla chemików i nie tylko (Excel for chemists and more), WNT, Warszawa, 2000.

2. Electronic statistics textbook (<http://www.statsoft.com/textbook>).

3. M. Otto, Chemometrics - Statistics and Computer Application in Analytical Chemistry (3rd Edition), Wiley VCH, Weinheim 2017. Available as e-book at Knovel e-sources on the web site of PUT library.

4. D. Bobrowski, K. Maćkowiak-Łybacka, Wybrane metody wnioskowania statystycznego, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.

Additional

1. J. Miller, J. Miller, Statystyka i chemometria w chemii analitycznej (Statistics and Chemometrics for Analytical Chemistry), PWN, Warszawa 2016.

2. A. Stanisław, Podręczny kurs statystyki (Handy statistics course), Wydawnictwo StatSoft, Kraków, 2006.

3. S.M. Kot, J. Jakubowski, A. Sokołowski, Statystyka (Statistics), Delfin, Warszawa, 2011.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	31	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	19	0,50