COURSE DESCRIPTION CARD - SYLLABUS

Course name
Chemometrics and elements of statistics [S1TCh2E>CiES]

Course

Field of study
Chemical Technology

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
30

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

The student should have basic knowledge in the field of mathematics, the basics of information technology, general chemistry and analytical chemistry.The student should also have a basic understanding of the Excel spreadsheet.

Course objective

The main goal of the course is to learn the basics of statistical processing of experimental data (with particular emphasis on data obtained in the chemical laboratory). Moreover, developing skills in reading, processing and presenting statistical data.

Course-related learning outcomes

Knowledge:
A student has the necessary knowledge of mathematics in terms of the use of mathematical methods to describe the problems and processes of chemistry, and to perform calculations needed in engineering.
K_W01

Skills:
The graduate can obtain necessary information from literature, databases and other sources related to chemical sciences, interpret them properly, draw conclusions, formulate and justify opinions.
K_U01
The graduate can work both individually and in a team environment in a professional and other environment.
K_U02
The graduate can implement the process of self-learning.
K_U05
The graduate can use computer programs that support the tasks typical of technology and chemical engineering, plan chemical experiments, examine the course of chemical processes and properly interpret the results obtained.
K_U07
The graduate can use mathematical knowledge to simulate, design, optimize and characterize simple chemical processes and unit operations.
K_U08
The graduate can assess the suitability of routine methods and techniques appropriate for solving engineering tasks of a practical nature in chemical technology, can also select and apply the appropriate method and technique.
K_U14

Social competences:
The graduate understands the need to develop and improve their professional, personal and social competences.
K_K01
The graduate can cooperate and work on a team, inspire and integrate engineering environments.
K_K03
The graduate can appropriately determine the priorities for accomplishing the assigned task.
K_K04
The graduate can correctly identify problems and makes appropriate career choices, in accordance with professional ethics.
K_K05

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lecture is checked during the test. First part of the tutorials course is verified on a written colloquium. In the second part of the course, the project made in MS Excel is evaluated. Activity classes are also assessed. Passing threshold: 50% of points.

Programme content

Issue related to chemometrics and elements of statistics

Course topics

The scope of the subject involves issues related to:
- Basic concepts of the probability theory.
- Random variables.
- Basic concepts of mathematical statistics (descriptive statistics).
- Point and interval estimation.
- Statistical hypotheses.
- Simple linear regression.
- Factorial experiments.
-Statistical processing and calculation of experimental data on the MS Excel computer program and presentation of statistical data in the project.

Teaching methods

1. Lecture: a multimedia presentation illustrated with examples given on the blackboard by the teacher.
2.Tutorials: a multimedia presentation presenting the content of tasks and tips. The Exercises are solved

on the blackboard. In the second part of the course a project are made in the MS Excel computer program.

Bibliography

Basic:
Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying E. Ye, Probability & Statistics for Engineers & Scientists, Global Edition, 9/E, Pearson 2016, 816 pp. ISBN-10: 1292161361 • ISBN-13: 9781292161365
John R. Taylor, An Introduction to Error Analysis. The Study to Uncertainties in Physical Measurements, 2 ed. University Science Books, Sausalito, California, 1997.

Additional:
Aviva Petrie, Caroline Sabin, Medical Statistics at a Glance Text and Workbook, Wiley Blackwell, 2013, 288 pp, ISBN: 978-1-118-50335-5

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	45	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	5	0,50