



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technological project

### Course

Field of study

Chemical Technology

Area of study (specialization)

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Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

30

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr hab. inż. Katarzyna Staszak

Responsible for the course/lecturer:

dr inż. Katarzyna Dopierała

### Prerequisites

Student has basic knowledge of mathematics in the field enabling him to use mathematical methods to describe chemical issues and processes and perform calculations needed in engineering activities.

He has basic knowledge of chemistry in the scope enabling him to understand chemical phenomena and processes.

He has basic knowledge of products and processes used in chemical technology.



## Course objective

The aim of the course is to learn how to balance technological processes and solve problems constructed in this way using the Mathcad numerical calculation tool. The second goal is to learn the correct placement of control and measurement equipment in the process diagram.

## Course-related learning outcomes

### Knowledge

The student has knowledge in the field of chemical technology and engineering, machinery and apparatus of the chemical industry. The student has basic knowledge about the life cycle of products, equipment and installations in the chemical industry. Student knows basic methods, techniques, tools and materials used in solving simple tasks in the field of chemical technology and engineering (K\_W01, K\_W03, K\_W06, K\_W07).

### Skills

The student is able to work both individually and as a team in professional and other environments. He/she can prepare technological documentation and communicate using various techniques in a professional and other environment, also in a foreign language. (K\_U01, K\_U06, K\_U07, K\_U14)

### Social competences

The student is aware of the cost of conducting numerical calculations. The student understands the importance of using a digital approach to solving issues in an engineering environment. Additionally, the student is aware of the necessity of using solutions in terms of apparatus and energy savings. (K\_K02)

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Semester evaluation of the completed project, consisting of a preliminary pre-project analysis, the quality of the completed project and the preparation of the final report and assessment of the ability to solve issues related to mass balance of stationary processes.

In the case of stationary classes, credit is given in a computer laboratory, while in the case of online classes credit is given using the university's network and computer infrastructure (VPN) via the Remote Desktop Protocol (RDP) using a remote desktop connection tool.

## Programme content

Building mass balances in the form of mathematical equations and solving them with a numerical tool - the Mathcad program. Using the tools for creating diagrams and technological diagrams - Ms Visio.

## Teaching methods

Presentation of approaches for equation resolution and nonlinear equation systems with the Mathcad tool. At this stage, the teacher assists students in using the CAD tool without solving any design problems.

During the completion of target credit projects, students are assisted in the functioning of the software, but they make their own design decisions for which they are responsible.



## Bibliography

### Basic

1. K. Schmidt, J. Sentek, J. Raabe, E. Bobryk, Podstawy technologii chemicznej. Procesy w przemyśle nieorganicznym. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2004.
2. A. Sobczyńska, J. Szymanowski, "Bilanse masowe procesów stacjonarnych", Wydawnic-two Politechniki Poznańskiej, Poznań 2003.
3. J. Kępiński, Technologia Chemiczna Nieorganiczna, PWN, Warszawa,1984.
4. E. Bortel, H. Koneczny, Zarys technologii chemicznej, PWN, Warszawa 1992
5. J. Molenda, Technologia Chemiczna, Wyd. Szk. i Ped., Warszawa 1997.
6. T. Grzywa, J. Molenda, Technologia podstawowych syntez chemicznych, tom 1 i tom 2, WNT, Warszawa 2008.
7. K. Staszak, K. Wieszczycka, B. Tylkowski, Chemical Technologies and Processes , de Gruyter, 2020.

### Additional

1. Praca zbiorowa pod redakcją W. Bobrownicki, Technologia chemiczna nieorganiczna, WNT, Warszawa 1965.
2. Current articles in the field of chemical technology.

## Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	35	1,5
Student's own work (literature studies, preparation for tutorials, preparation for tests, project preparation) <sup>1</sup>	25	0,5

<sup>1</sup> delete or add other activities as appropriate