COURSE DESCRIPTION CARD - SYLLABUS

Course name
Information technology

Course

Field of study	Year/Semester
Chemical technology	**1/1**
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	**polish**
Form of study	Requirements
full-time	**compulsory**

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15		
Tutorials	Projects/seminars	
	15	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Prerequisites

Fundamental knowledge realted to computers and their importance for human society.

Course objective

To familiarize students with the specifics of computers. To indicate the width of areas of use of digital machines in the scientific, design and engineering environment, as well as in the area of functioning of society. Special sensitisation of students to a number of non-intuitive phenomena occurring during design, numerical or simulation calculations. The subject is profiled from a technical point of view, with particular emphasis on the application of digital tools in the field of chemical technology and engineering.

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Course-related learning outcomes

Knowledge

The effect of teaching this subject is the knowledge of the advantages and limitations of using computer-aided techniques. Special emphasis is placed on the knowledge of the realities of computer-aided design and the characteristics of conducting simulation calculations. (K_W15)

Skills

Lecture: The lecture presents a general description of how computers work and function. A large number of examples of computer support tools are presented, e.g. a typical mathcad-type mathematical environment or a .NET-type programming platform in tasks constructed in a "live" form. Therefore, the student has basic skills that allow him or her to understand the computer-aided environments that he or she may come into contact with in the future. Additionally, the student has the skills to correctly use digital tools or software that uses numerical methods. (K_U07)

Project: Ability to use Mathcad mathematical software. (K_U07)

Social competences

The student is aware of the importance of digital devices for human society. Particular emphasis is placed on the impact of digital machines on the quality and efficiency of design and analytical tasks, with particular emphasis on the chemical technology environment. (K_K02)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Examination of the content presented in the lecture. The exam in stationary or remote mode.

Project: Ongoing check of the degree of mastery of the material on colloquia. Colloquium in stationary or remote mode. In the case of stationary classes, colloquia are given in a computer laboratory, while in the case of online classes colloquia are given using the university's network and computer infrastructure (VPN) via the Remote Desktop Protocol (RDP) using a remote desktop connection tool.

Programme content

Lecture: Hardware structure and computer architecture. Introduction to information theory. Methods of computer notation. Influence of numerical limitations on conducting calculations. Communication of a computer with the outside world. Multiprocessor architecture. Operating systems. Multitasking operating systems and their characteristics. Parallel calculations, their advantages, disadvantages and risks of errors. Symbolic methods. Principles of numerical solution finding together with illustrations of selected methods.

Project: Basic learning how to enter and edit formulas, getting used to the specifics of Mathcad's operation - for example, to perform calculations "live". Mathematical operators: differential, integral, sum, etc... Symbolic calculations. Importing data from a text or excel file. Saving data to file. Graphs of data and 2D functions, and also 3D. Calculations with matrices and vectors. Units, conversion to different systems e.g. SI to CGS etc. Simple statistics e.g. average, median, standard deviation, etc. Linear (slope, intercept) and non-linear (genfit) regression. Solving equations and systems - solve-block.

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Solving ordinary differential equations and systems - given odesolve. Solving of partial differential equations and systems - given pdesolve.

Teaching methods

Lecture: Presentation at the lecture. Creating live examples illustrating the issues discussed with the help of selected programming toolshc and CAD (Mathcad, Visual Studio).

Project: Presentation of the functioning of applied tools, current exercises performed by students in computer laboratories.

Bibliography

Basic

Podstawy technik informatycznych i komunikacyjnych / Witold Sikorski. Autor: Sikorski, Witold. Wydawnictwo Naukowe PWN: Mikom, 2009.

Technologie informatyczne i ich zastosowania / pod red. Aleksandra Jastriebowa. Autor: Jastriebow, Aleksander. Red. Politechnika Radomska im. Kazimierza Pułaskiego: Instytut Technologii Eksploatacji - Państwowy Instytut Badawczy, cop. 2010.

Gajewski R., Janczewski M., PTC Mathcad Prime 3.0. Obliczenia i programowanie, PWN 2014.

Additional

Technologie informacyjne - przykłady zastosowań: materiały do wykładów / Marek Cieciura. Autor: Cieciura, Marek. Vizja Press & It, 2007.

Technologia informacyjna / Jae K. Shim, Joel G. Siegel, Robert Chi ; przeł. [z jęz. ang.] Adam Oracz. Autor: Shim, Jae K., Siegel, Joel G., Chi, Robert., Oracz, Adam . Tł. Dom Wydawniczy ABC, 1999.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	32	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	18	1,0

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[1] delete or add other activities as appropriate