GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer assited design, PG_00058226		
Field of study	Biotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Iwona Cichowska-Kopczyńska	
	Teachers	dr inż. Iwona Cichowska-Kopczyńska	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	0.0	45.0	0.0	45

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	45	2.0	28.0	75

Subject objectives

The aim of the course is to familiarize students with the issues of using computer aided design software in the design of processes of engineering and chemical technology, as well as with the principles of selecting software to solve a specific problem and design algorithms. The scope of the course covers the use of advanced computer aided design tools.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U06] is able to apply statistical methods, computer solutions, especially bioinformatics methods to design experiments and technologies, analyze experimental results and technological processes and solve and technological processes and solve problems in the field of biotechnology, is able to use biotechnological databases	The student is able to choose the appropriate IT tool to solve a specific problem and use this tool to obtain data, design solutions and analyze data.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K7_W10] has knowledge in the field of bioprocess technology and engineering and knowledge in the field of engineering design of technical objects and processes including engineering graphics with the use of computer-aided design and databases	The student knows the principles of designing technological processes, knows what data are necessary for the proper design of the process, knows how to use computer-aided design tools	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Using AutoCAD software, students learn graphical description of technological processes, e.g. graphic diagrams and technological diagrams of industrial processes. In addition, they learn orientation on planes, perform graphic representations of 3D elements on a plane, e.g. isometric representations based on orthogonal projections, which is an introduction to the construction of 3D objects and aims to develop spatial orientation and imagination. In the next stage, with the use of Autodesk Inventor software, the students make 3D structures and assembly the parts of devices, machines, tools and on their basis prepare technical documentation. Then, using the ChemCAD software, they simulate chemical processes, prepare mass and energy balances.

The student prepares a project on the basis of the description of the technological process provided by the teacher and literature information. Its implementation includes the preparation of schematic and technological diagrams, the design of the equipment needed to carry out the process and the simulation of the mass and energy balance of the process using appropriate digital tools.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Basic computer skills, Microsoft Office software, knowledge on geometry, dimensioning and basics of technical drawing, basic English skills, knowledge of machine science, process engineering and chemical technology.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>graphic diagrams</td><td>60.0%</td><td>30.0%</td></tr>
<tr><td>Simulations</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>3D design</td><td>60.0%</td><td>30.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. A. Jaskulski, AutoCAD 2021 PL/EN/LT. Metodyka efektywnego projektowania parametrycznego i nieparametrycznego 2D i 3D, 2021

2. A. Jaskulski Autodesk Inventor Professional 2021 PL / 2021+ / Fusion 360. Metodyka projektowania, 2021

3. S. Romanowski, Symulacje komputerowe w fizyce i chemii, 2009

4. M. Feld, Podstawy projektowania procesów technologicznych typowych części maszyn, PWN 2022

5. L. Synoradzki, Projektowanie proc.techn.Od laboratorium do instalacji przemysłowej, OWPW</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">C. Johnson, Technical Drawing with Engineering Graphics, 2016

C. Apgrawal, Engineering Graphics, 2017

A. Chandra, Engineering Graphics, 1999</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">1. Simulate a three-dimensional object viewed from specific viewpoints by aligning elements along three major isometric axes.

2. Make an isometric view of the 2D part.

3. Based on the description, make a schematic / technological diagram of the process.

4. Design a tool / element / device to carry out a given process in 3D.

5. Prepare technical documentation of the element / tool / device.

6. Simulate the process and provide the energy and material balance of the process.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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