



## Subject card

Subject name and code	Computer Aided Design, PG_00036287						
Field of study	Green Technologies						
Date of commencement of studies	October 2020	Academic year of realisation of subject				2022/2023	
Education level	first-cycle studies	Subject group				Obligatory subject group in the field of study Subject group related to scientific research in the field of study	
Mode of study	Full-time studies	Mode of delivery				at the university	
Year of study	3	Language of instruction				Polish	
Semester of study	5	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		
	[K6_U04] capable of formulating and solving design tasks in the field of environmental technology to recognize their non-technical aspects, including environmental, economic and legal. Is capable of applying the principles of occupational health and safety. Is able to make initial assessment of engineering solutions and actions	The student is able to identify the impact of specific technological solutions on the elements of the environment and is able to analyze and interpret the economics of processes.			[SU2] Assessment of ability to analyse information [SU5] Assessment of ability to present the results of task		
	[K6_W04] is aware of the importance of environmental protection and has a basic knowledge of chemical and biological threats to the environment, with particular emphasis on anthropogenic factors, has a basic knowledge of knowledge of the principles of sustainable development as well as national and European environmental management conditions.	The student is able to correctly identify the factors and effects and independently proposes a solution consistent with the assumptions of sustainable development.			[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U03] is able to use information and communication technologies relevant to the common tasks of engineering, is able to use known methods and mathematical-physical models to describe and explain phenomena and chemical processes	The student has the ability to select the appropriate software to solve a specific engineering problem. The student is able to properly characterize chemical processes using appropriate models and tools.			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		

Subject contents	<p>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.</p> <p>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.</p>														
Prerequisites and co-requisites	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.														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="459 477 786 506">Subject passing criteria</th> <th data-bbox="802 477 1137 506">Passing threshold</th> <th data-bbox="1153 477 1481 506">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="459 510 786 539">graphic diagrams</td> <td data-bbox="802 510 1137 539">60.0%</td> <td data-bbox="1153 510 1481 539">30.0%</td> </tr> <tr> <td data-bbox="459 544 786 573">3D design</td> <td data-bbox="802 544 1137 573">60.0%</td> <td data-bbox="1153 544 1481 573">30.0%</td> </tr> <tr> <td data-bbox="459 577 786 607">Simulations</td> <td data-bbox="802 577 1137 607">60.0%</td> <td data-bbox="1153 577 1481 607">40.0%</td> </tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	graphic diagrams	60.0%	30.0%	3D design	60.0%	30.0%	Simulations	60.0%	40.0%		
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graphic diagrams	60.0%	30.0%													
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Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. A. Jaskulski, AutoCAD 2021 PL/EN/LT. Metodyka efektywnego projektowania parametrycznego i nieparametrycznego 2D i 3D, 2021</li> <li>2. A. Jaskulski Autodesk Inventor Professional 2021 PL / 2021+ / Fusion 360. Metodyka projektowania, 2021</li> <li>3. S. Romanowski, Symulacje komputerowe w fizyce i chemii, 2009</li> <li>4. M. Feld, Podstawy projektowania procesów technologicznych typowych części maszyn, PWN 2022</li> <li>5. L. Synoradzki, Projektowanie proc.techn.Od laboratorium do instalacji przemysłowej, OWPW</li> </ol>													
	Supplementary literature	<p>C. Johnson, Technical Drawing with Engineering Graphics, 2016</p> <p>C. Apgrawal, Engineering Graphics, 2017</p> <p>A. Chandra, Engineering Graphics, 1999</p>													
	eResources addresses														
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Simulate a three-dimensional object viewed from specific viewpoints by aligning elements along three major isometric axes.</li> <li>2. Make an isometric view of the 2D part.</li> <li>3. Based on the description, make a schematic / technological diagram of the process.</li> <li>4. Design a tool / element / device to carry out a given process in 3D.</li> <li>5. Prepare technical documentation of the element / tool / device.</li> <li>6. Simulate the process and provide the energy and material balance of the process.</li> </ol>														
Work placement	Not applicable														