



Subject card

Subject name and code	Desing of Manufacturing Processes, PG_00058228						
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			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Chemistry, Technology and Biochemistry of Food -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Robert Tylingo					
	Teachers	dr hab. inż. Robert Tylingo dr inż. Szymon Mania					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	30.0	0.0	30
	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	30	5.0		15.0	50	
Subject objectives	The aim of the course is to familiarize the student with the methods of teamwork and the preparation of technical documentation of an industrial installation, taking into account industry issues, and to acquire the ability to design technological processes related to the selected diploma course, including technological projects in the food, pharmaceutical and molecular biotechnology industries.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U10] is able to use knowledge about possibilities, aims and limitations of biotechnology to develop, design and obtain products and biotechnological processes in the area of his/her specialization	Technology, Biotechnology and Food Analysis - food processing and HACCP system. Drug Biotechnology - pharmaceutical industry and GMP systems Molecular biotechnology - technologies for the use of genetically modified organisms and standards related legal.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
	[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	He can use the knowledge of the properties of biomolecules and the course of bioprocesses in the design of biotechnological processes.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[K7_W08] has a profound knowledge of methods of obtaining biotechnological products, possibilities and limitations related to the design of biotechnological processes, understands the specificity of the biotechnological industry, both in terms of organization, management and economic analysis	Can critically evaluate the available technical and biotechnological solutions in industry, adapt to the project economically advantageous solutions from the point of view of the resources necessary for its implementation.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		

Subject contents	<p>I - Project management, Critical path for the implementation of project tasks, Work schedule (Gantt chart) Reporting on the implementation of individual project tasks. II - Technological project Short description Justification of the choice of the technological method Description of the technological method and alternative solutions Schematic diagram of the process Mass balance (Sankey chart) Optional energy and heat balance Characteristics of raw materials, semi-finished products, products and auxiliary materials. Selection of apparatus, variants of apparatus depending on technological solutions and production volume. Technological scheme Equipment work schedule (Gantt chart) The critical path of the technological process</p>								
Prerequisites and co-requisites	<p>Has sufficient knowledge in inorganic, organic, analytical and physical chemistry to understand technological processes Has knowledge of the basic techniques and research tools used in biotechnology and selected methods of related fields and scientific disciplines; knows the development of biotechnology methods; understands the basic techniques used in the isolation, selection, synthesis, modification and analysis of organisms, tissues, cells and molecules Knows the principles of operation of basic measurement and process equipment used in chemistry and biotechnology Can use the scientific language typical for biotechnology</p>								
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 869 794 898">Subject passing criteria</th> <th data-bbox="799 869 1137 898">Passing threshold</th> <th data-bbox="1142 869 1481 898">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 904 794 931">Project</td> <td data-bbox="799 904 1137 931">60.0%</td> <td data-bbox="1142 904 1481 931">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Project	60.0%	100.0%
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Project	60.0%	100.0%							
Recommended reading	Basic literature	<p>Anderson N.G. Practical Process Research and Development. Academic Press, San Diego, California, USA, 2000</p> <p>Pikoń J. Podstawy Konstrukcji Aparatury Chemicznej. Cz. 1, Tworzywa Konstrukcyjne. PWN, Warszawa, 1979</p> <p>Synoradzki L., Wisiański J. Podstawy projektowania procesów technologicznych. Od laboratorium do instalacji przemysłowej. Oficyna wydawnicza Politechniki Warszawskiej. 2019</p> <p>GMP, HACCP, ISO 22000 system requirements.</p>							
	Supplementary literature	<p>Synoradzki L., Wisiański J. Podstawy projektowania procesów technologicznych. Matematyczne metody planowania. eksperymentów. Oficyna wydawnicza Politechniki Warszawskiej. 2019</p> <p>Synoradzki L., Wisiański J. Podstawy projektowania procesów technologicznych. Bezpieczeństwo procesów chemicznych. Oficyna wydawnicza Politechniki Warszawskiej. 2018.</p>							
	eResources addresses	Adresy na platformie eNauczanie:							
Example issues/ example questions/ tasks being completed	Support for Auto CAD software in the implementation of technological diagrams of the designed process.								
Work placement	Not applicable								