



Subject card

Subject name and code	Principles of Processes Design and Technical Documentation Preparation, PG_00049664						
Field of study	Engineering and Technologies of Energy Carriers						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to practical vocational preparation		
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	practical 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. Robert Aranowski					
	Teachers	dr inż. Robert Aranowski dr hab. inż. Anna Zielińska-Jurek dr inż. Aleksandra Malachowska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	15.0	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	8.0		22.0	75	
Subject objectives	The course aim is to familiarize the student with the methods of preparing technical documentation of industrial installations with including industry issues (electrical, mechanical, automation, water and sewage, health and safety and fire protection).						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U05	Student is able to approach the design processes in system way, especially noting the social, economic, technical and technological aspects.			[SU3] Assessment of ability to use knowledge gained from the subject		
	K7_W12	The student is able to use computer software for calculations and designing processes for separating mixtures on a scale from analytical to process.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	K7_U06	Student is able to determine the basic profitability indicators of the project, such as: rate of return, pay-out time, return of investment, etc.			[SU1] Assessment of task fulfilment		
	K7_W04	Student is able to use computer software to implement the design cycle of an industrial installation. The student is able to perform process design.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
K7_W10	Student is able to use computer software to implement the design cycle of an industrial installation. The student is able to perform a three-dimensional model of the installation and mathematical simulation of the process.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects			

Subject contents	Technological principles, design heuristics. Discussion of technical documentation: installation location plan, equipment location plan, technological scheme (flow diagram), pipeline isometric diagrams, environmental impact assessment, material and heat balance, equipment power balance, auxiliary utilities balance, P & ID schemes, hazard analysis report and capabilities operational, three-dimensional visualization of installations, process specifications, technical and operational documentation of devices and industrial installations, apparatus assembly drawings, explosion protection document, license for technological process using . Creating detailed planning documentation for pipelines including fittings, tanks and heat exchanger.		
Prerequisites and co-requisites	Basic components knowledge of basic components of the process design, the basics and principles of chemical technology, the idea and technological scheme, the principles of preparation a flow, mass and energy balance, principles of technical drawings, basic organic and inorganic technologies, construction of machines and apparatus of the chemical industry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		60.0%	30.0%
		60.0%	40.0%
		60.0%	30.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. <i>Ludwik Synoradzki, Jerzy Wisiański, Projektowanie procesów technologicznych. Bezpieczeństwo procesów chemicznych, Politechnika Warszawska, 2012,</i> 2. <i>Adam Gołuch, Projektowanie - instalacje sanitarne i elektryczne: symbole i oznaczenia graficzne, normy obliczania i projektowania, wymagania, polskie normy, Kanon, 1998</i> 3. <i>Mirosław Żurek, Projektowanie instalacji budowlanych, Instytut Technologii Eksploatacji Państwowy Instytut Badawczy, Radom 2005,</i> 4. <i>Osikowicz Łukasz, Szczerba Krzysztof, Zasady bezpiecznej eksploatacji obiektów, Wydawnictwo Centrum Naukowo-Badawczego Ochrony Przeciwpożarowej, Józefów 2012,</i> 5. <i>Konrad Bąkowski, Sieci i instalacje gazowe, Wydawnictwo Naukowe PWN, Warszawa 2014,</i> 6. <i>Jacek Jeżewski, Wprowadzenie do projektowania systemów technologii chemicznej, cz. I, Teoria, Rzeszów 2001</i> 7. <i>Jacek Jeżewski, Wprowadzenie do projektowania systemów technologii chemicznej, cz. II, Przykłady, Rzeszów 2002</i> 8. <i>PN-EN 60079-10-1 Atmosfery wybuchowe: Klasyfikacja przestrzeni Gazowe atmosfery wybuchowe,</i> 9. <i>PN-EN 61882:20016-07 - Badania zagrożeń i zdolności do działania (badania HAZOP) -- Przewodnik zastosowań</i> 	
	Supplementary literature	<ol style="list-style-type: none"> 1. <i>PN-E-08350-14:2002 Systemy sygnalizacji pożarowej. Projektowanie, zakładanie, odbiór, eksploatacja i konserwacja instalacji,</i> 2. <i>PN-ISO 8421-7:2000 Ochrona przeciwpożarowa. Terminologia. Środki wykrywania i tłumienia wybuchu,</i> 3. <i>Rozporządzenie ministra pracy i polityki socjalnej z 26 września 1997 r. w sprawie ogólnych przepisów bezpieczeństwa i higieny pracy</i> 4. <i>Ustawa z dnia 24 sierpnia 1991r. o ochronie przeciwpożarowej,</i> 	
	eResources addresses	Adresy na platformie eNauczanie: Zasady projektowania i przygotowania dokumentacji technicznej, IiTNE, 2023-24 - Moodle ID: 38068 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=38068	
Example issues/ example questions/ tasks being completed	Prepare a technological project of a nitrobenzene production plant - scale 200,000 tons per year. Based on the technological project, prepare a simulation of the methanol production process using ChemCAD. List and discuss the elements of the technological project of the industrial installation. List and characterize at least the necessary elements of technical documentation of the presented device / installation. Name following symbols used in the technical documentation according to the appropriate nomenclature.		
Work placement	Not applicable		