



Subject card

Subject name and code	Team Project, PG_00049615						
Field of study	Electrical Engineering						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies		Subject group		Optional subject group 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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Waldemar Kamrat				
	Teachers		prof. dr hab. inż. Waldemar Kamrat dr inż. Kornel Borowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	75.0	0.0	75
	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	75		11.0		39.0	125
Subject objectives	Achieving of electrical structure objects designing competences						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U13	The project group presents the effects of its work, discusses the problems in the groups and exchanges experiences with other students. The more difficult design problems encountered are discussed in a general format.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	K7_K05	Students working in a small project group will learn the basic scope of work of the enterprise for which they will design the power outlet, through the 110kV / MV switchgear, MV switchgear and low voltage network.	[SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills
	K7_W08	They learn about additional possibilities of control systems, EAZ systems based on the existing available technical solutions.	[SW3] Assessment of knowledge contained in written work and projects
	K7_K03	Project groups distribute tasks to each group participant, the work is coordinated by the group manager. As a result, a schedule is developed for the design work.	[SK3] Assessment of ability to organize work [SK1] Assessment of group work skills
	K7_U11	On the basis of the developed power supply concept, students select electrical power devices. When selecting devices, apart from technical requirements, they are also guided by economic criteria.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	K7_U09	The student acquires the ability to design selected power facilities, analyze the economic aspects of investments.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
Subject contents	Grounds for expediency of building a substation. The location of substation. Conditions for supplying the substation and conveying the transmission lines to substation. Detailed data and reliability specifications for recipients supplied by the substation. The choice of solution of the switching station. The required supply schemes. The selection of main transformers The selection of major equipment is basic to any substation design. Switching station WN- the required schemes. Switching station SN- the required schemes The substation "s auxiliaries. Own requirements of the substation. The reactive power compensation The security automatics. Grounding protection of the substation effective relaying and insulation of equipment. Electric shock protection. Constructional conception		
Prerequisites and co-requisites	Knowledge of the Basics of Electrical Engineering, Electrical Power Engineering, Power Systems Engineering, Power Industry Engineering,		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	50.0%	100.0%
Recommended reading	Basic literature	1. Beldowski T., Markiewicz H.: Stacje i urządzenia elektroenergetyczne. WNT, Warszawa 1998. 2. Nartowski Z.: Stacje elektroenergetyczne 110-750 kV. WNT, Warszawa 1984. 3. Poradnik Sieci elektroenergetyczne w zakładach przemysłowych t. 2; Elektroenergetyczne stacje i linie; WNT Warszawa, 1990. 4. Praca zbiorowa: Poradnik inżyniera elektryka, tom 3, rodz. 5 Sieci elektroenergetyczne, WNT, Warszawa 1997	
	Supplementary literature	1. Seidel S.: Rozdzielnie i stacje transformatorowe; wyd. IV; Wydawnictwo Uczelniane Politechniki Poznańskiej; Poznań 1967. 2. Strojny J., Strzałka J.: Projektowanie urządzeń elektroenergetycznych; AGH, Kraków 2001	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	tranformer station systems, axialiary devices , system configuration		
Work placement	Not applicable		