



Subject card

Subject name and code	Team Project, PG_00049608						
Field of study	Electrical Engineering						
Date of commencement of studies	October 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	Part-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	dr inż. Kornel Borowski prof. dr hab. inż. Waldemar Kamrat					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	50.0	0.0	50
	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	50	32.0		43.0	125	
Subject objectives	Achieving of electrical structure objects designing competences						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_W08	<p>The student has the knowledge to perform a technical and economic analysis with multivariate of possible technical solutions. Student has the knowledge and defines the assumptions enabling the implementation of the project such as a station transformer-distribution station 110/15 kV constituting the main power supply point for loads of I and II category. The student according to his own technical analysis selects location of the substation of the electric power station, type of substation, selects the power transformers, selects the schematic switchgear, selects elements of the main circuits of switchgear and substations. The student has knowledge of design, selection of automatics protection in selected line fields, including proposal of settings, as well as settings for systems automatic control, etc.</p>	<p>[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation</p>
	K7_U13	<p>The student is able to evaluate the course and effects of work in a team implementing the engineering design of an electric power facility. The student is able to present the results of his/her work and acquires skills of developing technical documentation, as well as acquires the skills to use the technical documentation developed by other students, as well as available as part of the implementation of the project. The student is able to creatively use the knowledge and skills gained during the course of study developing the issues of design issues and coordinating them with individuals in the project group</p>	<p>[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information</p>
	K7_U11	<p>The student is able to select electrical power equipment, using various criteria including economic. The student is able to select:</p> <ul style="list-style-type: none"> -transformer capacities -cross sections of cable and overhead -current and voltage transformers 	<p>[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject</p>

	Course outcome	Subject outcome	Method of verification
	K7_K03	Students can design selected electrical power facility, in terms of the various components of the design. Student is able to interact in a group completing design assumptions and knowledge of the broader design. The student is able to identify conditions legislative and legal conditions for the facility.	[SK3] Assessment of ability to organize work [SK1] Assessment of group work skills
	K7_K05	The student is able to act in a creatively and solve the posed design problems. Student Proposes technical solutions, as well as design limitations and on his own looks for technical solutions.	[SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills
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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	Substation systems, axialiary devices , system configuration		
Work placement	Not applicable		