



Subject card

Subject name and code	Electric Machines, PG_00038397						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2021	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	Part-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Michał Michna					
	Teachers	dr hab. inż. Michał Michna dr inż. Filip Kutt dr inż. Roland Ryndzionek					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	20.0	0.0	0.0	40
	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	40		8.0		77.0	125
Subject objectives	Get acquainted with construction, theory and application of electric machines and transformers. Verification of the theory in the laboratory.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_W06	Student explains the general principles of construction and physical basics of electric machines, Student explains the construction, operation and modeling of transformers, student draws and explains the basic characteristics of transformers, student explains the construction, operation and modeling of DC machines, student draws and explains the basic characteristics of DC machines, student explains the construction, operation and modeling of synchronous machines, student draws and explains the basic characteristics of synchronous machines, student explains the construction, operation and modeling of induction machines, student draws and explains the basic characteristics of induction machines, student explains the general principles of designing electrical machines	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	K6_K01	Student understands the importance of constantly expanding their knowledge and skills regarding electrical machines and their applications. Student can use up-to-date technical documentation and publications for this purpose.	[SK5] Assessment of ability to solve problems that arise in practice
	K6_U11	Student connects the measuring system according to the scheme. Student selects the appropriate measuring instruments. Student correctly reads the meter indications. Student prepares a report on the measurements.	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
	K6_K02	Student organizes work in a team. Student chooses the appropriate methods of solving problem. Student exchanges information with the team members. Student uses technical language. Student knows how to estimate the time needed to complete task. Student is able to implement the work schedule.	[SK1] Assessment of group work skills [SK4] Assessment of communication skills, including language correctness [SK3] Assessment of ability to organize work
K6_K05	Student explains the basic principles of health and safety. Student applies the basic principles of health and safety. Student is able to react in emergency situations	[SK4] Assessment of communication skills, including language correctness [SK3] Assessment of ability to organize work	
Subject contents	<p>LECTURE Kinds of magnetic fields and its making. Electrical machines and material technology. Classification of electrical machines. Magnetic circuit main dimension calculation. Properties and characteristics of motors and generators. Calculation of electrical machines and transformer parameters.</p> <p>LABORATORY Transformer properties. Characteristics of asynchronous motor fed from converter and power system. Characteristics of shunt direct current motor and generator. Characteristics of synchronous generator and parallel works at power system.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Writing, practical and oral exam	50.0%	90.0%
	Practical exercise	100.0%	10.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> Ronkowski M., Michna M., Kostro G., Kutt F.: Maszyny elektryczne wokół nas: zastosowanie, budowa, modelowanie, charakterystyki, projektowanie. (e-skrypt) Wyd. PG, Gdańsk, 2009/2011. Matulewicz W.: Podstawy teorii maszyn elektrycznych, Wyd. PG, Gdańsk 2014 Matulewicz W., Chomiakow M: Badania podstawowe maszyn elektrycznych. Wyd. PG, Gdańsk 2014 Roszczyk S.: Teoria maszyn elektrycznych. WNT, W-wa 1979 J. F. Gieras, Electrical Machines: Fundamentals of Electromechanical Energy Conversion, 1st Edition. Boca Raton: CRC Press, 2016 	

	Supplementary literature	<ol style="list-style-type: none"> 1. Fitzgerald A.E, Kingsley Ch. (Jr.), Umans S. D.: Electric Machinery. New York: McGraw-Hill Book Comp. 2003. Gieras J. F.: Advancements In Electric Machines, Springer, 2008. 2. Rafalski W., Ronkowski M.: Zadania z Maszyn Elektrycznych, cz. I, II. Wyd. 4/3 (skrypty) Wyd. PG, Gdańsk 1994. 3. Plamitzer A.: Maszyny elektryczne. WNT, W-wa 1976. 4. Manitius Z.: Transformatory. Maszyny prądu stałego. Maszyny Synchroniczne. Maszyny asynchroniczne. (seria skryptów). Wyd. PG, Gdańsk 1973 - 1978. 5. Latek W.: Teoria Maszyn Elektrycznych. WNT, W-wa, 1982. 6. Staszewski P., Urbański W.: Zagadnienia obliczeniowe w eksploatacji maszyn elektrycznych, Warszawa, Oficyna Wydawnicza Politechniki Warszawskiej 2009
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Explain the methods of DC motors speed regulations, describes forms of 3-phase transformer constructions.	
Work placement	Not applicable	