GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electric Machines, PG_00049755		
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2021/2022
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	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	English
Semester of study	4	ECTS credits	6.0
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. Andrzej Wilk	
	Teachers	dr inż. Filip Kutt dr hab. inż. Andrzej Wilk	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	30.0	0.0	0.0	75

E-learning hours included: 0.0

Adresy na platformie eNauczanie:

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	64.0	150

Subject objectives

This lecture is designed to satisfy modern requirements by providing basic understanding of the nature and operating principles of tranaformers, asynchronous machines, synchronous machines and DC machines.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W05	The student has knowledge of electrical engineering necessary to understand the basics of electrical machines	[SW3] Assessment of knowledge contained in written work and projects
K6_U03	The student knows the safety rules for the operation of electrical machines	[SU3] Assessment of ability to use knowledge gained from the subject
K6_K03	The student is able to operate in emergency situations of electrical machines	[SK3] Assessment of ability to organize work

Subject contents

Principles of transformers. Circuit representations of transformers. Transformer losses and efficiency. Component fluxes and inductances. Multi-winding transformers. Three-phase connections of transformers.Principles of induction machines. Induction motor equivalent circuits in steady state. Performance evaluation from the equivalent circuit. Operating characteristics . Transient states in induction motor - general. Speed control of induction machines.Principles of synchronous machines, Reactances and effects of saliency. The circuit equivalent model. Steady -state characteristics and phasor diagrams. Armature reaction. Transient performance of synchronous machines. Permanent magnet synchronous machines.

Prerequisites and co-requisites

Basic knowledge of electrical engineering

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Test	60.0%	100.0%

Recommended reading	Basic literature	[1] Roszczyk S.: Teoria maszyn elektrycznych, WNT Warszawa, 1979 r. [2] Thaler G.J., Wilcox M.: Electric machines: Dynamics and Steady State, Wiley, New York, London, Sydney,1966. [3] Sen P.C.: Principles of electric machines and power electronics, Wiley, USA, 2012. [4] Gerling D.: Electrical machines. Mathematical fundamentals of machine topologies, Springer, - Verlag, berlin, Heidelberg 2015.
	Supplementary literature	Ronkowski M., Michna M., Kostro G., Kutt F.: Maszyny elektryczne wokół nas, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2011
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Open and short-circuit test of transformers. 2. Equivalent circuit of induction motor. 3. Generator volt-ampere characteristic	
Work placement	Not applicable	