Course Title:	**Power Generators and Transformers**
Institute/Division:	Department of Electrical Engineering Faculty of Electrical and Computer Engineering
Course code:	**E-PGT**
Erasmus subject code:	0713 Electricity and energy
Number of contact hours:	45
Course duration:	1 semester (Fall/Winter)
ECTS credits:	6
Course description:	The aim of the course is to familiarize students with the design features, principles of electromechanical energy conversion in power generators and transformers. The course includes the following topics: • Structure of a generalized power system: concepts of production, transformation, transmission and consumption of electrical energy and the role of power generators and voltage transformers. • Transformers: construction and principle of operation, circuits and connection groups of three-phase transformers, equivalent circuit and determination of its parameters, voltage variation, power losses and efficiency, parallel operation of transformers. • Cylindrical and salient pole synchronous machines: construction and principle of operation, description of steady state at synchronous speed, equivalent circuits in d-q axes, determination of equivalent circuit parameters, stand-alone operation and cooperation with the synchronous generator network, phasor diagrams for motor, generator and compensator operation, generator synchronization with the network. • Induction generators for the needs of renewable energy systems: construction and principle of operation, equivalent circuit and determination of its parameters, electromagnetic torque and range of stable operation, power balance and efficiency, starting and speed control. After completing the course student should be able to know concepts of production, transformation, transmission and consumption of electrical energy and the role of power generators and voltage transformers, to perform calculations and analysis of the selected state of steady-state operation of an power generator and methods of stand-alone operation and cooperation with the synchronous generator network, to explain measurement methods for testing power transformers and generators, to select the methods and scope of measurements of power transformers and generators, to select of the transformer for the network.
Course type:	Lectures (15h), Laboratory (15h), Exercises (15h)
Literature:	S.K. Sandhev, "Electric machines", Cambridge University Press, 2018 H.M.Allasouli, "Electric machines: Lecture notes", Kindle Edition, 2020

	P.C.Sen, "Electric machines end power electronics third edition", John Wiley & Sons Inc, 2013
Assessment method:	Laboratory exercises and practical calculations
Prerequisites:	Analysis of electrical circuits, Electromechanical energy conversion, Solving electromagnetic field problems
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