



Course title: Electric machines

ECTS credit allocation (and other scores): 5

Semester: autumn

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 15+15

Course coordinator/ Department and e-mail: Maciej Neugebauer, Department of Electrical, Power, Electronic and Control Engineering, mak@uwm.edu.pl

Type of classes: classes and lectures

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Substantive content

**CLASSES:** Combining the starting and properties of asynchronous cage motors. Methods of regulating the rotational speed of asynchronous motors. Determination of the characteristics of a three-phase squirrel-cage motor. Determination of the characteristics of a series DC motor. Testing a DC shunt motor with a foreign excitation. Ring engine testing. Testing a single-phase transformer. Examination of connection systems of a three-phase transformer. Self-excited generator testing. Synchronous generator research.

**LECTURES:** Basic concepts and laws of electromagnetism - applications in the theory of electrical machines. Structural elements and materials of electrical machines. Transformers. DC machines - series, shunt and series-shunt machines. Engine and generator work. Operation characteristics of AC motors and generators. Induction machines. Balance of power and losses, efficiency. Synchronous and asynchronous machines - construction and principle of operation. Cooperation with a rigid network, power regulation. Mechanical and electrical characteristics. Special machines.

**Learning purpose:** Understanding the principles of choosing the type of electric machine for a specific purpose.

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On completion of the study programme the graduate will gain:

**Knowledge:** Knows the principle of operation of basic types of electrical machines.

**Skills:** Is able to select electrical machines to specific needs and energy installations.

**Social Competencies:** Can identify and resolve dilemmas related to the performance of the entrusted task.

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**Basic literature:** J.A. Melkebeek, Electrical Machines and Drives, Springer 2018; S.K. Sahdev, Electrical Machines, Cambridge, 2017

**Supplementary literature:**

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The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 62

Student's independent work: 60