

DESCRIPTION OF THE COURSES

- **Course code:** ELR3107
- **Course title:** PERMANENT MAGNET MACHINES
- **Language of the lecturer:** Polish

<i>Course form</i>	<i>Lecture</i>	<i>Classes</i>	<i>Laboratory</i>	<i>Project</i>	<i>Seminar</i>
<i>Number of hours/week*</i>	2				
<i>Number of hours/semester*</i>	30				
<i>Form of the course completion</i>	Pass				
ECTS credits					
Total Student's Workload					

- **Level of the course:** advanced
- **Prerequisites:** Passed subjects: Electric machines part I and II
- **Name, first name and degree of the lecturer/supervisor:** Ignacy Dudzikowski
Ph.D., D.Sc., prof.
- **Names, first names and degrees of the team's members:** Piotr Zieliński Ph.D., Marek Ciurys M.Sc., Dariusz Gierak M.Sc., Tomasz Zawilak M.Sc.
- **Year:** 2 **Semester:** 3
- **Type of the course:** optional
- **Aims of the course (effects of the course):**

The aim of the course is to learn construction, principle of operation and electromagnetic phenomena in ac and dc permanent magnet machines.

- **Form of the teaching:** traditional
- **Course description:**

Parameters and properties of permanent magnets. Typical structures of magnetic circuits in the following permanent magnet machines: synchronous, brushless and commutator direct current, reluctance, stepping and tachogenerators. An analysis of a magnetic field, demagnetisation resistance, time characteristics at converters fed. Applications: computer technique, automatics and robotics, motorization, aviation, alternate sources of energy, consumer products.

- **Lecture:**

<i>Particular lectures contents</i>	<i>Number of hours</i>
1. An analysis of parameters and properties of the permanent magnets used in electric machines	2
2. Pulse magnetization of permanent magnets	2

3. Solving of the magnetic circuits of permanent magnet machines	4
4. Magnetic flux stabilization, resistance to demagnetisation	2
5. Permanent magnet direct current machines	
– commutator, wobble-plate, drag-cup	2
– brushless	3
6. Synchronous motors and generators	2
7. Reluctance motors with permanent magnets, stepping motors	2
8. Design and optimisation problems	3
9. Permanent magnet machines co-operation with controlled rectifiers: electromagnetic phenomena, electrical and mechanical transients, electromechanical parameters	2
10. Permanent magnet machines co-operation with pulse converters: electromagnetic phenomena, transients, electromechanical parameters	2
11. Applications: computer hardware, audio-video equipment, automatics and robotics, motorization, aviation, alternate sources of energy, consumer products	2
12. Credit	2

- **Basic literature:**

1. Glinka T. : Maszyny elektryczne o magnesach trwałych, Wydawnictwo Politechniki Śląskiej, Gliwice 2002
2. Sochocki R.: Mikromaszyny elektryczne, Wydawnictwo Politechniki Warszawskiej, 1996
3. Dudzikowski I.: Silniki komutatorowe o magnesach trwałych, Wydawnictwo Politechniki Wrocławskiej, 1992

- Additional literature:

1. Gieras J. F., Wing M.: Permanent magnet motor technology, Marcel Dekker, Inc. New York, Basel 2002

- **Conditions of the course acceptance/creditation:** knowledge of the problems discussed on the course

* - depending on a system of studies