

DESCRIPTION OF THE COURSES

- **Course code:** ARR3102
- **Course title:** ELECTRIC MACHINES I
- **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>	Examination				
<i>ECTS credits</i>	4				
<i>Total Student's Workload</i>	120				

- **Level of the course:** basic
- **Prerequisites:** Passed subjects: Basis of electric engineering, electric circuits 1 i 2
- **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:** Jan Zawilak Ph.D., D.Sc., Prof., Ludwik Antal Ph.D., D.Sc., Prof., Tomasz Janta Ph.D., Olgierd Kasaty Ph.D., Piotr Zieliński Ph.D., Maciej Antal M.Sc., Marek Ciurys M.Sc., Dariusz Gierak M.Sc., Piotr Kisielewski M.Sc., Tomasz Zawilak M.Sc.
- **Year:** 2 **Semester:** 4
- **Type of the course:** obligatory
- **Aims of the course (effects of the course):**
The aim of the course is to learn: construction, principle of operation, equivalent circuit diagrams, operating characteristics and electromechanical parameters of typical electric machines and transformers.
- **Form of the teaching:** traditional
- **Course description:**

Magnetic circuits of electric machines and transformers. Magnetic fields in electric machines. Electromotive force. Electromagnetic torque. Construction, principle of operation, circuit models, basic parameters and operating characteristics of: transformers, asynchronous, synchronous and DC commutator machines.

- **Lecture:**

<i>Particular lectures contents</i>	<i>Number of hours</i>
1. Transformer construction, electromagnetic phenomena, electromotive force. No-load state, load state, short-circuit state. Equivalent circuit diagrams, equations, phasor diagrams	3
2. Three - phase transformers: schemes of connections, vector groups,	3

parallel running	
3. Magnetic fields of electric machines: constant field, variable field, rotating field	3
4. Windings of three - phase machines: principles of making diagrams, electromotive force induced in winding, elimination of higher harmonics of electromotive force	2
5. Asynchronous machines: construction, principle of operation. No-load state, load state, short-circuit state. Equivalent circuit diagrams, equations, phasor diagrams	3
6. Electromagnetic torque of asynchronous machines, electromechanical characteristics, power and losses balance	2
7. Starting of asynchronous motors, rotational speed control	2
8. Synchronous machines: construction, principle of operation, electromagnetic torque, generator and motor work	2
9. Equivalent circuit diagrams, equations and phasor diagrams of synchronous machines. Steady-state characteristics of synchronous generators	2
10. Pulling into step with power system, synchronous motors starting problem, reactive power compensation	2
11. DC machines: construction, principle of operation. Generators – operating characteristics	2
12. DC motors: operating characteristics, starting, rotational speed control	2
13. Review of the basic types of electric micromachines	2

- **Basic literature:**

1. Plamitzer A., Maszyny elektryczne. WNT 1989

- **Additional literature:**

1. Antal L., Janta T., Zieliński P., Maszyny elektryczne ćwiczenia laboratoryjne. Oficyna Wydawnicza Politechniki Wrocławskiej 2001

- **Conditions of the course acceptance/creditation:** examination

* - depending on a system of studies