

DESCRIPTION OF THE COURSE

- **Course code:** ELR3162
- **Course title:** ELECTRO-MACHINE COMPONENTS OF AUTOMATICS
- **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>	<i>1</i>		<i>1</i>		
<i>Number of hours/semester*</i>	<i>11</i>		<i>11</i>		
<i>Form of the course completion</i>	<i>written test</i>		<i>completion of lab exercises</i>		
<i>ECTS credits</i>					
<i>Total Student's Workload</i>					

- **Level of the course:** advanced
- **Prerequisites:** Completed basic courses of Electrical Machines and Electric Drives
- **Name, first name and degree of the lecturer/supervisor:** Krzysztof Makowski Ph.D. D.Sc. Eng.
- **Names, first names and degrees of the team's members:**
Ignacy Dudzikowski, Ph.D. D.Sc. Eng., Jan Zawilak Ph. D. D.Sc. Eng.,
Ludwik Antal Ph.D. D.Sc. Eng.
- **Year:** 1 **Semester:** 2 **2007/08**
- **Type of the course:** optional
- **Aims of the course** (effects of the course): To learn about construction, methods of determination of parameters and performance characteristics of the micro-motors, methods of control and operating electromechanical converters applying in industry automatic systems.
- **Form of the teaching:** traditional
- **Course description:** Micro-machines for automatics – basic requirements. Type of micro-machines: DC/AC commutator motors, single-phase induction and synchronous motors. Stepper motors: methods of control, mechanical characteristics, applications. Position transducers: selsyn control transformers, synchro-control transformers. Speed converters: DC/AC rate generators, speed and position measuring systems. DC servomotors: field and armature control systems. AC servomotors: two-phase induction motors, voltage and torque equations. Typical automatic control systems with electro-machines.

- **Lecture:**

<i>Particular lectures contents</i>	<i>Number of hours</i>
1. General description of the micro-machines for automatics – basic requirements. Methods of analysis.	1
2. Types of micro-machines: DC/AC commutator motors, single-phase	1

induction and synchronous motors.	
3. Stepper motors: principle of operation, methods of control, mechanical characteristics, applications	2
4. Position transducers: synchro-control transformers, selsyns and selsyn systems, transformer synchro-system	2
5. Speed and position converters: DC rate generators, two-phase induction rate generators, synchronous rate generators, speed and position measuring systems.	2
6. DC servomotors: principle of construction and operation, field and armature control systems. AC servomotors: principle of construction and operation, two-phase induction servomotors, voltage and torque equations.	2
7. Practical control systems with electro-machines used in automatics.	1

- Classes – the contents:
- Seminars – the contents:
- **Laboratory** – the contents:

Includes testing of the E-MCA operated in typical control systems:

1. Testing of synchronous micro-motor. 2. Testing of selsyn system. 3. Testing of two-phase servomotor. 4. Testing of commutator servomotor.

- Project – the contents:

• **Basic literature:**

1. Praca zbiorowa, *Elektryczne maszynowe elementy automatyki*, WNT, Warszawa 1983.
2. Sochocki R. : *Mikromaszyny elektryczne*, OWPW, Warszawa 1996.
3. Wróbel T.: *Silniki skokowe*, WNT, Warszawa 1993.

4. **Additional literature:**

1. Chruszczew W.W., *Elektromaszynowe elementy automatyki. Teoria i obliczanie*. PWN, Warszawa 1973.
2. Smith J., *AC micro-machinery*, Cleredon Press, New York 1994.

- **Conditions of the course acceptance/creditation:** Passing of a written test and completion of lab exercises.

* - depending on a system of studies