DESCRIPTION OF THE COURSE

2007/08

- **Course code**: ELR3106
- **Course title**: ELECTRO-MACHINE COMPONENTS OF AUTOMATICS
- **Language** of the lecturer: Polish

Course form	Lecture	Classes	Laboratory	Project	Seminar
Number of hours/week*	1		1		
Number of hours/semester*	15		15		
Form of the course completion	written test		completion of lab exercises		
ECTS credits					
Total Student's Workload					

- **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
- **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:**

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

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.	2	
7. AC servomotors: principle of construction and operation, two-phase induction servomotors, voltage and torque equations.	2	
8. 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. 5. Testing of induction rate generator. 6. Testing of DC rate generator.

- 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/credition**: Passing of a written test and completion of lab exercises.

* - depending on a system of studies