DESCRIPTION OF THE COURSES

- Course code: ARR3222
- Course title: **Converters Control Systems**
- Language of the lecturer: *English*

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	1	0	1	1	0
*Number of hours/semester**	15	0	15	15	0
Form of the course completion					
ECTS credits					
Total Student's Workload					

- Level of the course (basic/advanced): *advanced*
- Prerequisites: *power electronics*
- Name, first name and degree of the lecturer/supervisor: *dr Zdzisław Załoga*
- Names, first names and degrees of the team's members:
- Year:..... Semester:.....
- Type of the course (obligatory/optional): *optional*
- Aims of the course (effects of the course): *get acquainted with control systems off power electronics systems*
- Form of the teaching (traditional/e-learning): *traditional supported with electroncs*
- Course description:

Drivers for: semicontrolled switches: SCRs, triacs , fully controlled switches: GTOs, BJTs, power MOSFETs, IGBTs. Triggering and phase control. Phase control systems for: rectifiers, AC converters, cycloconverters and control systems for DC-DC converters, inverters. PWM techniques. Common applications.

- Lecture:

Particular lectures contents	*Number of hours*
1. Drivers for power semiconductor switches: thyristors, triacs, gate- turn- off thyristors, bipolar - junction transistor, metal- oxide-semiconductors field effect transistor, insulated gate bipolar transistor. Triggering and phase control	*2*
2. Control systems for line frequency phase-controlled rectifiers and inverters: single phase converters, three phase converters	*2*
3. Control systems for A-C voltage controllers: single phase A-C voltage controllers, three phase A-C voltage controllers	
4. Control system for cycloconverters	*2*
5.Control systems for DC-DC switch mode converters: step- down choppers, step- up choppers. Four - quadrant choppers	*2*
6. Control systems for DC-AC switch mode converters: single phase inverters, tree phase inverters, voltage source inverters, current source	

inverters 7. PWM techniques 8. Common applications	*2* *2* *2* *1*

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

Testing off:

1. Drivers for SCRs thyristor
2. Drivers for BJTs transistor
3. Control systems for phase controlled six-pulse rectifier
4. Control systems for three phase AC voltage controller
5. Control systems for three phase voltage inverter
6. Control systems for three phase PWM inverter
7. Control systems for inverter and AC voltage source cooperation

6 obligated and 1 reserved

- Project – the contents: :

1. Drivers for SCRs thyristor
2. Drivers for BJTs transistor
3. Control systems for phase controlled rectifiers
4. Control systems for AC voltage controller
5. Control systems for inverters
6. Control systems for PWM inverters

- Basic literature:

[1] N. Mohan, T. M.Undeland, W.P. Robbins, *Power Electronics. Converters, Applications, Design*, John Wiley & Sons, Inc. 1995

[2] A.M. Trzynadlowski, *Introduction to Modern Power Electronics*, John Wiley & Sons, Inc. 1998

- Additional literature:

[1] T.H.Barton, Rectifiers, *Cycloconverters and AC Controllers*, Claredon Press – Oxford 1994

- Conditions of the course acceptance/credition:

* - depending on a system of studies