DESCRIPTION OF THE COURSES

- Course code: ARR3221
- Course title: **Power Electronics in Industrial Automatic**
- Language of the lecturer: *English*

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	*2*	*0*	*1*	*0*	*0*
*Number of hours/semester**	*30*	*0*	*15*	*0*	*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: I Semester: II
- Type of the course (obligatory/optional): *optional*
- Aims of the course (effects of the course): *get acquainted with power electronics application to industrial automatic systems*
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- Form of the teaching (traditional/e-learning): *traditional supported electronic*
- Course description:

Power Diodes. Semicontrolled Switches . Fully Controlled Switches. Phase Controlled Rectifiers. Phase Controlled AC Converters. DC-DC Converters. Inverters. PWM Techniques. Common Applications of Converters in industrial automatic.

- Lecture:

Particular lectures contents	*Number of hours*
1.Power Semiconductor Switches industrial series	*1*
2.Line frequency Phase-controlled Rectifiers and Inverters for dc motor Control	*2*
3.Line frequency Phase-controlled Rectifiers and Inverters for dc-input power electronic converters as inverters and choppers	
4. Line frequency Phase-controlled Inverters allowing power transmission to the ac supply system	*2*
5. Line frequency Phase-controlled Rectifiers as bttery chargers	
6. Line frequency Phase-controlled Rectifiers in high-voltage dc transmission lines	*2*
7. A-C Voltage Controllers based on SCRs and TRIACs	
8. A-C Voltage Controllers used in lighting and heating control	*2*
9. A-C Voltage Controllers as soft starters for induction motors	*2*
10. A-C Voltage Controllers for speed control off high-inertia induction	

motor drive 11. Step-down Choppers in traction 12. Step-down Choppers in electric vehicles 13. Inverters used in direct DC-AC and indirect AC-AC power conversion systems 14. Inverters for induction motor control 15.Tree phase inverters used to produce voltage supplied from photovoltaic array. 16. High frequency transformer	*2* *2* *2* *2* *2* *2* *2* *2* *1*

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

Testing off:

1.Single phase cycloconverter.
2.Single Phase AC Voltage Controller for heating.
3. Inverter used indirect AC-AC power conversion system.
4. Supply device based on high frequency transformer.
5. Inverter and AC Voltage Source Cooperation/
6. Four-quadrant DC chopper.

- Project – the contents:
- 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