

## DESCRIPTION OF THE COURSES

- Course code: **ARR3227**
- Course title: Power Electronics I
- Language of the lecturer: Polish, Russian

<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>	pass				
<i>ECTS credits</i>	3				
<i>Total Student's Workload</i>	90				

- Level of the course (basic/advanced): basic
- Prerequisites: electronics
- Name, first name and degree of the lecturer/supervisor: dr Leszek Pawlaczyk
- Names, first names and degrees of the team's members: dr Zdzisław Załoga
- Year: III.. Semester: V
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course): get acquainted with power electronics devices and systems
- Form of the teaching (traditional/e-learning): traditional
- Course description: Principles and method of electric power conversion. Semiconductor power switches. AC-to-DC converters. AC-to-AC converters. DC-to-DC converters. DC-to AC converters
- Lecture:

Particular lectures contents	Number of hours
1. Semiconductor power switches. Protection schemes	2
2. Uncontrolled rectifier, Controlled rectifier, Process line-supported commutation.	2
3. Phase controlled inverters. Circulating dual converter.	2
4. AC voltage controlled, Phase controlled AC voltage controllers, DC to DC converters, Step – down choppers, Step – up choppers.	2
5. DC – DC converters, step – down and step – up coppers.	2
6. Voltage – sours inverters.	2
7. PWM techniques for voltage source inverter. Voltage space – vector modulation.	2
8. Current source inverters	2
9. Signal – phase and there phase PWM rectifiers	2
10. Resonant converters	2
11. Zero voltage switching – and zero current switching converters	2
12. Cycloconverters and matrix converters	2

13. Basic control of power converters	2
14. Influence of power converters on supply network and receivers.	2
15. Applications power converters for electrical drives, and other applications	2

- Basic literature:

1. Trzynadlowski A.: Modern Power Electronics, John Wiley, 1998.
2. M. H. Rashid: Power electronics, Pearson Education International 2004.
3. Mohan N., Undeland R.m, Robbins W.: Power Electronics, John Wiley 2003.
4. Tunia H., Winiarski B.: Energoelektronika. Warszawa WNT 1994.
5. Barlik R., Nowak M.: Technika tyrystorowa. Warszawa WNT 1994.
6. Barlik R., Nowak M.: Poradnik inżyniera energoelektronika. Warszawa WNT 1994.
7. Frąckowiak L., Januszewski S.,: Energoelektronika część 1. Wydawnictwo Politechniki Poznańskiej.2001.
8. Frąckowiak L.: Energoelektronika część 2. Wydawnictwo Politechniki Poznańskiej.1998.

- Additional literature:

1. Januszewski S., Świątek H., Zymmer K.: Półprzewodnikowe przyrządy mocy. WKŁ 1999.
2. Piróg S.: Energoelektronika. Kraków Wydawnictwo AGH 1998.
3. Nowacki Z.: Modulacja szerokości impulsów w napędach przekształtnikowych prądu przemiennego.
4. Tunia H., Winiarski B.: Podstawy energoelektroniki. Warszawa WNT 1987.
5. Tunia H., Kaźmierkowski M.: Automatyka napędu przekształtnikowego. Warszawa PWN 1987.
6. Strzelecki R., Supronowicz H.: Współczynnik mocy w systemach zasilania prądu przemiennego i metody jego poprawy. Warszawa Oficyna Wydawnicza Politechniki Warszawskiej. 2000.

- Conditions of the course acceptance/creditation: credition

\* - depending on a system of studies