

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Komputerowo wspomagane projektowanie napędów przekształtnikowych**  
 Name in English: **Computer-aided design of converter fed drives.**  
 Main field of study (if applicable): **Control Engineering and Robotics**  
 Specialization (if applicable):  
 Level and form of studies: **1st level, full-time**  
 Kind of subject: **optional**  
 Subject code: **ARR043219**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):				30	
Number of hours of total student workload (CNPS):				60	
Form of crediting:				crediting with grade	
For group of courses mark (X) final course:					
Number of ECTS points:				2	
including number of ECTS points for practical (P) classes :				2	
including number of ECTS points for direct teacher-student contact (BK) classes:				1.40	

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Has basic knowledge in electrical machines
2. Has basic knowledge in component parts of electrical drives
3. Understands that attending to classes will improve skills and gain new knowledge
4. Is able to use the computer effectively in engineering calculations and is able to prepare reports from the classes

**SUBJECT OBJECTIVES**

- C1. Acquittance with computer-aided desing of converter fed drives  
 C2. Obtainment of the ability of choosing the component parts of electrical drives in dependence on the application  
 C3. Obtainment of the ability of experimental verification of designed converter fed drives  
 C4. Achieving the ability of critical analysis of obtained design calculation and elaboration in a form of reports  
 C5. Development of social skills in a range of team work, solving the problems and shared elaboration of results

**SUBJECT EDUCATIONAL EFFECTS***relating to knowledge:**relating to skills:*

PEK\_U01 Is able to use computer software in order to design the converter fed drive

PEK\_U02 Is able to select all component parts of electrical drive depending on the load machine type

*relating to social competences:*

PEK\_K01 Is aware of the team work responsibility in order to achive demanded goals

## PROGRAMME CONTENT

Form of classes - project		Number of hours:
Proj 1	Introduction. Acquittance with the rules for passing the project.	2
Proj 2	Acquittance with the computer software allowing the design of converter fed drives	2
Proj 3	Design of simple drive system with induction motor for constant-torque application	4
Proj 4	Experimental verification of designed drive system with induction motor	2
Proj 5	Design of a servo drive with induction motor for chosen application	6
Proj 6	Experimental verification of a servo drive with induction motor	2
Proj 7	Design of a servo drive with Permanent Magnet Synchronous Machine (PMSM) for chosen application	6
Proj 8	Experimental verification of a servo drive with Permanent Magnet Synchronous Machine (PMSM)	2
Proj 9	Analysis and optimization of electrical energy usage of chosen drive system	2
Proj 10	Final	2
Total hours:		<b>30</b>

## TEACHING TOOLS USED

N1. Own work - preparation for classes
N2. Design work with the software available in the laboratory
N3. Office hours
N4. Reports from classes

## EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation <i>F - forming (during semester) P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(P)	PEK_U01 PEK_U02	Reports from classes
F2(P)	PEK_K01	Activity during classess
P(P)	$P=0.7 \cdot F1 + 0.3 \cdot F2$	

## PRIMARY AND SECONDARY LITERATURE

### **PRIMARY LITERATURE:**

- [1]. Wspomagane komputerowo projektowanie zautomatyzowanych układów napędowych, pod red. K. Bisztygi, PWN, 1985, 216s.  
 [2]. Łastowiecki J., Elementy i podzespoły półprzewodnikowych układów napędowych, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1999

### **SECONDARY LITERATURE:**

- [1] Kaczmarek T., Zawirski K., Układy napędowe z silnikami synchronicznymi, Wydawnictwo Politechniki Poznańskiej, Poznań 2000  
 [2] Kałuża E., Zbiór zadań i ćwiczeń projektowych z trakcji elektrycznej, Skrypty Uczelniane Politechniki Śląskiej, Gliwice 1994  
 [3] Koczara Wł., Wprowadzenie do napędu elektrycznego, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2012  
 [4] Nowacki Z., Szewczyk J., Zbiór zadań z napędu i automatyki napędu elektrycznego, Wydawnictwo Politechniki Łódzkiej, 1982

## SUBJECT SUPERVISOR

Grzegorz Tarchała, grzegorz.tarchala@pwr.edu.pl
-------------------------------------------------

**MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT  
ARR043219 - Computer-aided design of converter fed drives.  
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Control Engineering and Robotics**

<b>Subject educational effect</b>	<b>Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)</b>	<b>Subject objectives</b>	<b>Programme content</b>	<b>Teaching tool number</b>
PEK_U01	K1AiR_U09	C.1 C.4	Proj2 Proj3 Proj4 Proj5 Proj6 Proj7 Proj8 Proj9	N.1 N.2 N.3 N.4
PEK_U02	K1AIR_AMPU_U04	C.2 C.3	Proj2 Proj3 Proj4 Proj5 Proj6 Proj7 Proj8 Proj9	N.1 N.2 N.3 N.4
PEK_K01	K1AiR_K03 K1AiR_K05 K1AiR_K09 K1AiR_K09	C.4 C.5	Proj2 Proj3 Proj4 Proj5 Proj6 Proj7 Proj8 Proj9	N.2 N.4