

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Komputerowo wspomagane projektowanie napędów przemysłowych**
 Name in English: **Computer-aided design of industrial drives**
 Main field of study (if applicable): **Industrial Control Engineering**
 Specialization (if applicable):
 Level and form of studies: **1st level, full-time**
 Kind of subject: **optional**
 Subject code: **APR013219**
 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 industrial 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 LEARNING OUTCOMES*relating to knowledge:**relating to skills:*

PEU_U01 Is able to use computer software in order to design the converter fed drive

PEU_U02 Is able to select all component parts of electrical drive depending on the load machine type

relating to social competences:

PEU_K01 Is aware of the team work responsibility in order to achive demanded goals

PROGRAMME CONTENT

Form of classes - laboratory		Number of hours:
Lab 1	Introduction. Acquittance with the rules for passing the project.	2
Lab 2	Acquittance with the computer software allowing the design of industrial drives	2
Lab 3	Design of simple drive system with induction motor for constant-torque application.	4
Lab 4	Experimental verification of designed drive system with induction motor.	2
Lab 5	Design of a servo drive system with induction motor for selected application.	6
Lab 6	Experimental verification of a servo drive with induction motor.	2
Lab 7	Design of a servo drive with Permanent Magnet Synchronous Machine (PMSM) for selected application.	6
Lab 8	Experimental verification of a servo drive with Permanent Magnet Synchronous Machine (PMSM).	2
Lab 9	Analysis and optimization of electrical energy usage of selected drive system.	2
Lab 10	Final evaluation and presentation of obtained results.	2
Total hours:		30

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 LEARNING OUTCOMES ACHIEVEMENT

Evaluation <i>F - forming (during semester) P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(L)	PEU_U01 PEU_U02	Reports from classes
F2(L)	PEU_K01	Activity during classess
P(L)	$P=0.7 \cdot F1 + 0.3 \cdot F2$	

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