COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electronics and power electronics

Course

Field of study
Electrical engineering

Year/Semester
3/5

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
	20	
Tutorials	Projects/seminars	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:
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Prerequisites

Knowledge in the field of mathematics, physics and circuit theory at the level of the first year of study. Ability to understand and interpret the transmitted messages and effective self-education in the field related to the chosen field of study.

Course objective

Practical knowledge of propriety and basic characteristics of power electronics converters, rectifiers, AC/AC converters, AC/DC converters and inverters.

Course-related learning outcomes

Knowledge

1. Knows and understands the basic laws of electrical engineering, properties of elements of electrical circuits, has detailed knowledge of the theory of electrical circuits (for steady and transient states), knows and understands the theory of long line.

2. Has structured knowledge in the field of metrology and the properties and operation of modern measuring equipment.

3. Knows the structure and operation of electronic, optoelectronic and simple analog and digital electronic and power electronic devices, understands the processes occurring in their life cycle.

Skills

1. Is able to plan and carry out simulation and measurements of basic quantities characteristic of electrical systems; can present the results obtained in numerical and graphic form, interpret them and draw the right conclusions.

2. Is able to make a critical analysis and assessment of the functioning of existing electrical systems and devices, using appropriate methods and tools.

Social competences

1. Is aware of the need to initiate actions for the public interest, understands the various aspects and effects of electrical engineer activities, including environmental impact, and the associated responsibility for decisions.

2. Is aware of the importance of own work and the need to comply with the principles of professional ethics, is ready to comply with the principles of team work and take responsibility for jointly implemented tasks, as well as care for the achievements and traditions of the profession.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment of knowledge and skills demonstrated during the written test-problem exam - based on the number of points obtained, evaluation of the exercise reports.

Programme content

Investigation of basic power electronic converters: 1-phase and 3-phase controlled rectifiers, alternating voltage regulators controlled symmetrically and unbalanced, pulse DC-DC regulators: thyristor and transistor. Investigation of 1- and 3-phase voltage inverters with PWM modulation. Simple active compensation systems.

Teaching methods

Laboratory

1. Continuous assessment, rewarding the increase in the ability to use known principles and methods.

2. Assessment of knowledge and skills related to the exercise, evaluation of the exercise report.

Bibliography

Basic

1. Barlik R., Nowak M., Technika tyrystorowa, Wydawnictwa Naukowo-Techniczne, Warszawa 1997.

2. Frąckowiak L., Januszewski S., Energoelektronika. Cz. 1, Półprzewodnikowe przyrządy i moduły energoelektroniczne, Wydawnictwo Politechniki Poznańskiej, Poznań 2001.

3. Mikołajuk K., Podstawy analizy obwodów energoelektronicznych, Państwowe Wydawnictwo Naukowe, Warszawa 1998.

4. Mohan N., Undeland N., Robins W., Power Electronics, Jon Wiley & Sons Inc., New York 1999.

5. Tunia H., Smirnow A., Nowak M., Barlik R., Układy energoelektroniczne. Obliczanie, modelowanie, projektowanie, Wydawnictwa Naukowo-Techniczne, Warszawa 1982.

Additional

1. Frąckowiak L., Energoelektronika. Cz. 2, Wydawnictwo Politechniki Poznańskiej, Poznań 2000.

2. Kaźmierkowski M., Krishnan R., Blaabjerg H., Control in Power Electronics, Academic Press, Amsterdam 2002.

3. Piróg S., Energoelektronika, Uczelniane Wydawnictwa Naukowo-Dydaktyczne AGH, Kraków 1998.

4. Strzelecki R., Supronowicz H., Współczynnik mocy w systemach zasilania prądu przemiennego i metody jego poprawy, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2000.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, preparation of the report - reports on the implemented laboratory exercise) [1]	20	1,0

[1] delete or add other activities as appropriate