COURSE DESCRIPTION CARD - SYLLABUS

Course name
Cicuit theory

Course

Field of study
Automatic Control and Robotiiics

Year/Semester
2/3

Area of study (specialization)
-

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
	30	
Tutorials	Projects/seminars	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Przemysłowej ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Information in the field of mathematics and physics at the level of the first year of study. Knowledge of the basic quantities describing electrical circuits. The ability to understand and interpret the messages conveyed and effective self-education in the field related to the selected field of study.

Course objective

Getting to know the theoretical problems of electrical engineering in practice. Acquiring the ability to analyze and conduct measurements (research experiments) of selected electrical circuits of direct and alternating current.

Course-related learning outcomes

Knowledge

1. has knowledge of the description and analysis of complex quantities in electrical circuits

2. has knowledge of the description, analysis and methods of signal processing in the time and frequency domains

3. has ordered, theoretically founded general knowledge in the field of the theory of electric circuits and electrical engineering of direct and alternating current (including three-phase)

4. has knowledge of the principles of measuring electrical quantities, knows and understands the methods of measuring electrical quantities

Skills

1. can use properly selected methods and measuring devices and measure the relevant signals and on their basis determine static and dynamic characteristics of automation elements and obtain information about their essential properties.

2. is able to build, run and test a simple electronic and electromechanical system

3. is able to develop documentation and present the results of a laboratory task performance presentation

Social competences

1. is aware of the need for a professional approach to technical issues, scrupulous familiarization with the documentation and environmental conditions in which devices and their components may function; is ready to comply with the principles of professional ethics and require it from others, respect for the diversity of views and cultures

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Laboratory exercises:

- checking knowledge in the form of written or practical tests,

- assessment of knowledge and skills related to the implementation of the exercise task on the basis of an individual report on the performed exercise,

- rewarding the aesthetic diligence of prepared reports and tasks as part of self-study.

Programme content

Principle of superposition, proportionality and reciprocity in electrical circuits. Thevenin and Norton theorem. Real source, matching receiver to source at maximum power. RLC elements in a sinusoidal alternating current circuit. Resonance in series and parallel circuit. Correcting the power factor. Measurement of active power in three-phase systems. Frequency analysis of LC-type quadripoints. Rectifiers and filtering systems.

Teaching methods

Laboratory: performing laboratory exercises in teams (preparation of the stand, building measuring systems, carrying out experiments) with the help and supervision of the teacher.

Bibliography

Basic

1. Robert L. Boylestad, Introductory Circuit Analysis, Pearson

2. John O'Malley, Theory and problems of Basic circuit analysis, McGraw-Hill

3. John Bird, Electrical circuit theory and technology, Newnes

4. Frąckowiak J., Nawrowski R., Zielińska M.: Laboratorium Elektrotechniki Teoretycznej, Wydawnictwo Politechniki Poznańskiej 2011

Additional

1. J.W. Nilsson & S.A. Riedel, Electric Circuits, 8th edition, Prentice Hall, 2008.

2. Bolkowski S., Brociek W., Rawa H.: Teoria obwodów elektrycznych. Zadania, WNT, Warszawa 1995.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	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, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate