STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Fundamentals of electricity		**1010341731010320166**
Field of study	Profile of study (general academic, practical)	Year /Semester
Mathematics in Technology	**general academic**	**2 / 3**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
First-cycle studies (Polish Qualifications Framework level six)	**full-time**	
No. of hours		No. of credits
Lecture: **30** Classes: **15** Laboratory: **15** Project/seminars: **-**		**4**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
major	**university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)
Technical sciences		**4 100%**
Technical sciences		**4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic information form math and physics at level of High School. [PQF 4]
2	**Skills**	Skills in understanding and interpretation of information and effective self-education in field of science related with chosen academic discipline. [K_U06 (P6S_UW), K_U09 (P6S_UW), K_U10 (P6S_UW), K_U11 (P6S_UW)]
3	**Social competencies**	Student should have consciousness of necessity of improving his competences, readiness to work individual and cooperate within groups. [K_K03 (P6S_KO)]

Assumptions and objectives of the course:

Introduction of physical values and basic laws and theorems in the field of theory of direct current circuits and one- or three-phases alternating current circuits. Introduction of techniques of electric circuits analysis.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. describe electric and electronic circuits, describe and explain laws and techniques of analysis of the circuits, such as: direct current circuits, one- and three-phase alternating current circuits, magnetic coupled circuits - [K_W04 (P6S_WG), K_W08 (P6S_WG)]

2. recognize and select methods of electric circuits analysis - [K_W03 (P6S_WG), K_W04 (P6S_WG), K_W08 (P6S_WG)]

Skills:

1. use knowledge in range of theory of circuits, necessary to determine parameters of circuits, such as: voltage, current, impedance, power, energy etc. - [K_U09 (P6S_UW), K_U10 (P6S_UW), K_U11 (P6S_UW)]

2. get information from literature and web, work individual, solve exercises in the field of theory of the electric circuits - [K_U06 (P6S_UW), K_U09 (P6S_UW), K_U10 (P6S_UW)]

Social competencies:

1. think and operate in enterprising way in the field of analysis of electric circuits - [K_K03 (P6S_KO)]

Assessment methods of study outcomes

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Lecture:

- assess the knowledge and skills listed on the written and oral exam of theory of circuits.

Auditorium exercises:

- assess skills of solving accounting exercises in range of analysis of electric and electronic circuits ? verification skills on every exercises and two tests during the semester.

Laboratories:

- the test and awarding a bonus to the essential knowledge of problems for the accomplishment stated in the given area of laboratory tasks,
- evaluation of the knowledge and the abilities associated with the performance of a task exercise.

Obtaining additional points for activity during exercises, in particular way for:

- proposing to discuss additional aspects of the subject,
- effective use of knowledge obtained during solving of given problem,
- comments related to improve teaching material,
- aesthetics of solved problems and reports - within homework.

Course description

Electrostatics, electric signals and classification, basic definitions in field of circuits with lumped parameters and circuits with distributed parameters, elements of electric circuits, arrow convention for voltage and current, electric circuits laws, methods of analysis of direct current circuits and one- and three-phases alternating current circuits (Kirchhoff's laws, Mesh-Current Method, Node-Voltage Method), circuits theorems: (Norton's theorem, Thevenin's theorem, Tellegen's theorem), real power, reactive power an complex power, energy in electric circuits, maximum power transfer theorem, magnetic coupled circuits, resonance effect, measurements of power and energy in electric circuits. Solving accounting tasks in field of analysis of direct current circuits, one- and three-phase alternating current circuits.

Updated 2017: Learning methods used:

A) lectures:

- lecture with multimedia presentation (including: drawings, photos, animations, sound, films) supplemented with examples given on the board;
- initiate discussion during the lecture;
- theory presented in connection with current knowledge of students;
- presenting a new topic preceded by a reminder of related content known to students from other subjects;

B) exercises:

- solving example tasks on the board;
- reminding basic theoretical information needed to solve the task;
- discussions and comments on how to solve tasks;
- Detailed review of the exercise by the instructor.

C) laboratories:

- instructors detailed review of the reports and discussions about comments, demonstrations, work in teams.

Update: 10.2018

Basic bibliography:

1. Kurdziel R., Podstawy elektrotechniki, WNT, Warszawa 1973
2. Bolkowski S., Teoria obwodów elektrycznych, WNT, Warszawa 2008
3. Szabatin J., Śliwa E., Zbiór zadań z teorii obwodów. Część 1, Wydawnictwo Politechniki Warszawskiej, Warszawa 2015
4. Mikołajuk K., Trzaska Z., Zbiór zadań z elektrotechniki teoretycznej, WNT, Warszawa 1978

Additional bibliography:

1. Krakowski M., Elektrotechnika teoretyczna, PWN, Warszawa 1995
2. Chua L. O., Desoer C. A., Kuh E. S., Linear and nonlinear circuits, McGraw-Hill Inc., New York 1987
3. Jastrzębska G., Nawrowski R., Zbiór zadań z podstaw elektrotechniki, Wydawnictwo Politechniki Poznańskiej, Poznań 2000

Result of average student's workload

Activity	Time (working hours)

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1. participation in the lectures, exercises and laboratory	60
2. participation in consultations on the lecture	5
3. participation in consultations on the exercises	5
4. participation in consultations on the laboratories	5
5. preparation for the auditorium exercises	10
6. homeworks	10
7. preparation for the lectures	10
8. preparation for the auditorium exercises	10
9. preparation for the laboratories	10

Student's workload

Source of workload	hours	ECTS
Total workload	125	4
Contact hours	75	3
Practical activities	30	1

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