

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Circuits theory		Code 1010321311010320173
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: 30 Laboratory: - Project/seminars: -		No. of credits 7
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 7 100% 7 100%
Responsible for subject / lecturer: Prof. dr hab. inż. Ryszard Nawrowski email: ryszard.nawrowski@put.poznan.pl tel. 616652788 Elektryczny ul. Piotrowo 3A, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic information form math and physics at level of High School.
2	Skills	Skills in understanding and interpretation of information and effective self-education in field of science related with chosen academic discipline.
3	Social competencies	Student should have consciousness of necessity of improving his competences, readiness to work individual and cooperate within groups.
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+++, K_W01++, K_W03++] 2. recognize and select methods of electric circuits analysis - [K_W04+++, K_W01++]		
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_U05+++, K_U11++, K_U23+] 2. get information from literature and web, work individual, solve exercises in the field of theory of the electric circuits - [K_U05+++, K_U11++]		
Social competencies: 1. think and operate in enterprising way in the field of analysis of electric circuits - [K_K01++, K_K02+]		
Assessment methods of study outcomes		

<p>Lecture:</p> <ul style="list-style-type: none"> - assess the knowledge and skills listed on the written and oral exam of theory of circuits. <p>Auditorium exercises:</p> <ul style="list-style-type: none"> - 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. <p>Obtaining additional points for activity during exercises, in particular way for:</p> <ul style="list-style-type: none"> - 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	
<p>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.</p> <p>Updated 2017: Learning methods used:</p> <p>A) lectures:</p> <ul style="list-style-type: none"> - 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; <p>B) exercises:</p> <ul style="list-style-type: none"> - 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. 	
Basic bibliography:	
<ol style="list-style-type: none"> 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:	
<ol style="list-style-type: none"> 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)
1. participation in the lectures	30
2. participation in the auditorium exercises	30
3. participation in consultations on the lecture	10
4. participation in consultations on the auditorium exercises	15
5. preparation for the auditorium exercises	15
6. homeworks	30
7. preparation for the exam	20
8. preparation for the auditorium exercises pass	15
9. participation in the exam	5
Student's workload	

Source of workload	hours	ECTS
Total workload	170	7
Contact hours	90	4
Practical activities	0	0