

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Fundamentals of electricity and electronics		Code 1010314421010325572
Field of study Power Engineering	Profile of study (general academic, practical) general academic	Year /Semester 1 / 2
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 30 Classes: 15 Laboratory: 15 Project/seminars: -		No. of credits 6
Status of the course in the study program (Basic, major, other) basic		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 6 100% 6 100%
Responsible for subject / lecturer: dr inż. Karol Bednarek email: Karol.Bednarek@put.poznan.pl tel. 616652659 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 and first semester of Energetics.
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 quantities and basic laws and theorems in the field of electric engineering and electronics, such as: direct current circuits, one- and three-phase alternating current circuits and basics of electronics. Knowledge of analysis and connection of electric and electronic circuits and carrying on measurements of selected electric values.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. describe electric and electronic circuits, describe laws and methods of analysis them for direct current circuits, one- and three-phases alternating current circuits, magnetic coupled circuits and simple electronic circuits - [K_W01++, K_W02++, K_W17+++] 2. recognize and select proper methods of analysis and testing of electrical and electronic circuits - [K_W01++, K_W02++, K_W04+]		
Skills: 1. use knowledge in field of the theory of electric and electronic circuits, necessary to determine parameters of circuits, such as : voltage, current, impedance, power, energy etc. - [K_U01++, K_U02++, K_U06+, K_U10++] 2. get information from literature and web, work individual, solve exercises by his own, connect and carry on measurements of electric quantities in range of basic electrical engineering - [K_U01++ K_U02++ K_U06+ K_U10++]		
Social competencies: 1. think and operate in enterprising way in the field of analysis of basic electric and electronic circuits - [K_K01+, K_K02+, K_K04+]		
Assessment methods of study outcomes		

<p>Lecture:</p> <ul style="list-style-type: none"> - assess the knowledge and skills listed on the written or oral exam of the basics of electrical engineering and electronics. <p>Auditorium exercises:</p> <ul style="list-style-type: none"> - assess skills of solving accounting exercises in field of analysis of electric and electronic circuits ? verification skills on every exercises and two tests during the semester. <p>Lab classes:</p> <ul style="list-style-type: none"> - verification of knowledge necessary to realize exercise, - verification of skill of connecting electric and electronic circuits, - verification of skill of carry on measurements and necessary calculations, - assess of reports from done exercise. <p>Obtaining additional points 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 self education. 	
Course description	
<p>Electric signals and classification. Basic definitions in field of electrical engineering and electronic. Elements of electric circuits, arrow convention for the 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 (Thevenin?s theorem, Norton?s theorem), real power, reactive power an complex power, energy in electric circuits, maximum power transfer theorem, magnetic coupled circuits, voltage and current resonance effect, measurements of power and energy in electric circuits. Basic of electromagnetism. Basic elements and electronic circuits. Solving accounting tasks in field of analysis of direct current circuits, one- and three-phase alternating current circuits. Elements of electronic circuits. Rules of connection an carrying on measurements in electric and electronic circuits.</p> <p>Update 2017:</p> <p>Applied methods of education:</p> <p>lecture - lecture using the board supplemented by multimedia presentation (including: drawings, photos, animations, sound, films); Presenting a new topic preceded by a reminder of related content, known to students from other subjects; taking into account various aspects of the issues presented, including: economic, environmental, legal, social, etc .;</p> <p>exercises - solving example tasks on the board; detailed review of the exercise by the instructor and discussion of the comments;</p> <p>laboratory - demonstrations of practical nuances specific to the issues, working in teams.</p>	
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Bolkowski S.: Teoria obwodów elektrycznych, WNT, Warszawa 1998. 2. Kurdziel R.: Podstawy elektrotechniki, WNT, Warszawa 1973. 3. Szabatin J., Śliwa E.: Zbiór zadań z teorii obwodów. Część 1, Wydawnictwo Politechniki Warszawskiej, Warszawa 1997. 4. Mikołajuk K., Trzaska Z.: Zbiór zadań z elektrotechniki teoretycznej, WNT, Warszawa 1978. 5. Frąckowiak J., Nawrowski R., Zielińska M.: Podstawy elektrotechniki. Laboratorium, Wydawnictwo Politechniki Poznańskiej, Poznań 2011. 	
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Krakowski M.: Elektrotechnika teoretyczna, PWN, Warszawa 1978. 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. 4. Bednarek K., Kompensacja mocy biernej i praca hybrydowa w systemach zasilania gwarantowanego (UPS), Poznan University of Technology Academic Journals, Electrical Engineering, No 74, Poznan 2013, p. 33-41. 5. Kasprzyk L., Bednarek K., Elektromagnetyzm a zagadnienia gromadzenia energii, Przegląd Elektrotechniczny, No 12 (90), 2014, s. 221-224, nr DOI: 10.12915/pe.2014.12.55. 	
Result of average student's workload	
Activity	Time (working hours)

1. participation in the lectures	30	
2. participation in the auditorium exercises	15	
3. participation in lab exercises	15	
4. participation in consultations on the lecture	5	
5. participation in consultations on the auditorium exercises	5	
6. participation in consultations on the lab classes	10	
7. preparation for the auditorium exercises	10	
8. homeworks	10	
9. preparation for the lab classes and making reports	20	
10. preparation for the exam	20	
11. preparation for the auditorium exercises pass	15	
12. participation in the exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	157	6
Contact hours	82	2
Practical activities	45	2