Field of study     Profile of study (general academic, practical)     Year /Semester       Automatic Control and Robotics     (brak)     2 / 3			STUDY MODULE D	ESCRIPTION FORM		
Automatic Control and Robotics       (general academic, practical) (brak)       2 / 3         Elective path/specialty       -       Subject offered in: Polish       Course (compulsory, election obligatory         Cycle of study:       -       Form of study (full-time, part-time)       Course (compulsory, election obligatory         No. of hours       -       full-time       No. of credits         Lecture:       -       Classes:       -       2         Status of the course in the study program (Basic, major, other) (brak)       (university-wide, from another field)       No. of credits         Education areas and fields of science and art       ECTS distribution (number and %)       ECTS distribution (number and %)         Responsible for subject / lecturer:       prof. dr hab. inż. Wojciech Machczyński email: wojciech.machczyński email: wojciech.machczyński		,	g			
Elective path/specialty       Subject offered in: Polish       Course (compulsory, election obligatory)         Cycle of study:       First-cycle studies       Form of study (full-time,part-time)       Course (compulsory, election obligatory)         No. of hours       Lecture:       Classes:       Laboratory:       30       Project/seminars:       No. of credits         Lecture:       -       Classes:       -       Laboratory:       30       Project/seminars:       -       2         Status of the course in the study program (Basic, major, other)       (university-wide, from another field)       (brak)       ECTS distribution (number and %)         Education areas and fields of science and art       ECTS distribution (number and %)       ECTS distribution (number and %)         Responsible for subject / lecturer: prof. dr hab. in:       Wojciaeth Machczyński email: wojciech.machczyński@put.poznan.pl tel. 6652383       Elektryczny ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:       E         1       Knowledge       Basic knowledge of mathematics and physics.       I         2       Skills       Ability to use literature, solving linear equations, ability to operate on complex numbers, abilit to observe and draw conclusions.       I         3       Social competencies       Ability to work in a team, attention to improving their own competence.			-	(general academic, practical)		
Cycle of study:       -       Polish       obligatory         Cycle of study:       First-cycle studies       Form of study (full-time,part-time)       full-time.         No. of hours       Lecture:       Classes:       -       Laboratory:       30       Project/seminars:       2         Status of the course in the study program (Basic, major, other)       (university-wide, from another field)       (brak)       2         Education areas and fields of science and at       (brak)       (brak)       (brak)       ECTS distribution (number and %)         Responsible for subject / lecturer:         prof. dr hab. inž. Wojciech Machczyński       email: wojciech.machczynski@put.poznan.pl       tel. 6652383         wydział Elektryczny       u. Piotrowo 3A 60-965 Poznań       E         Prerecusites in terms of knowledge, skills and social competencies:         1       Knowledge       Basic knowledge of mathematics and physics.       complex numbers, abilit to observe and draw conclusions.       ability to work in a team, attention to improving their own complex numbers, abilit to observe and draw conclusions.         3       Social competencies       Ability to work in a team, attention to improving their own complex numbers, abilit to observe and draw conclusions.       study outcomes and reference to the educational results for a field of study         3       Social completencies       Abilit	Auto	matic Control ar	nd Robotics	(brak)	2/3	
First-cycle studies       full-time         No. of hours       No. of credits         Lecture:       - Classes:       - Laboratory:       30       Project/seminars:       -       2         Status of the course in the study program (Basic, major, other)       (university-wide, from another field)       (brak)       2         Education areas and fields of science and at       ECTS distribution (number and %)       ECTS distribution (number and %)         Responsible for subject / lecturer:       prof. dr hab. inż. Wojciech Machczyński email: wojciech machczynski@put.poznan.pl tel. 6652383       ECTS distribution (number and %)         Prerequisites in terms of knowledge, skills and social competencies:       1       Knowledge         1       Knowledge       Basic knowledge of mathematics and physics.       2         2       Skills       Ability to use literature, solving linear equations, ability to operate on complex numbers, abilit to observe and draw conclusions.       3         3       Social competencies       Ability to work in a team, attention to improving their own competence.         Assumptions and objectives of the course:       Practical test circuit theory of rights and the most important observation of electrical phenomena.         Study outcomes and reference to the educational results for a field of study         Knowledge:       Study outcomes and reference to the educational results for a field of study	Elective	path/specialty	-		Course (compulsory, elective) obligatory	
No. of hours       No. of credits         Lecture:       Classes:       Laboratory:       30       Project/seminars:       2         Status of the course in the study program (Basic, major, other)       (university-wide, from another field)       (brak)       2         Education areas and fields of science and at       ECTS distribution (number and %)       ECTS distribution (number and %)         Responsible for subject / lecturer:       prof. dr hab. in2. Wojciech Machczyński email: wojciech.machczynski@put.poznan.pl       ECTS distribution (number and %)         tel. 6652383       Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań       Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge       Basic knowledge of mathematics and physics.       2         2       Skills       Ability to use literature, solving linear equations, ability to operate on complex numbers, abilit to observe and draw conclusions.       3         3       Social competencies       Ability to work in a team, attention to improving their own competence.         Practical test circuit theory of rights and the most important observation of electrical phenomena.       Study outcomes and reference to the educational results for a field of study         Knowledge:       Knowledge:       Study outcomes and reference to the educational results for a field of study	Cycle of	f study:		Form of study (full-time,part-time)		
Lecture:       Classes:       Laboratory:       30       Project/seminars:       2         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 att       (brak)       (brak)       ECTS distribution (number and %)         Responsible for subject / lecturer: prof. dr hab. inż. Wojciech Machczyński email: wojciech.machczynski@put.poznan.pl tel. 6652383 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań       ECTS distribution (number and %)         Prerequisites in terms of knowledge, skills and social competencies:       ECTS         1       Knowledge       Basic knowledge of mathematics and physics.         2       Skills       Ability to use literature, solving linear equations, ability to operate on complex numbers, abilit to observe and draw conclusions.         3       Social competencies       Ability to work in a team, attention to improving their own competence.         Practical test circuit theory of rights and the most important observation of electrical phenomena.       Study outcomes and reference to the educational results for a field of study Knowledge:		First-cyc	cle studies	full-time		
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(brak)       (brak)         Education areas and fields of science and at       ECTS distribution (number and %)         Responsible for subject / lecturer:       prof. dr hab. inż. Wojciech Machczyński email: wojciech.machczynski@put.poznan.pl tel. 6652383         Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań       Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge       Basic knowledge of mathematics and physics.         2       Skills       Ability to use literature, solving linear equations, ability to operate on complex numbers, abilit to observe and draw conclusions.         3       Social competencies       Ability to work in a team, attention to improving their own competence.         Assumptions and objectives of the course:       Practical test circuit theory of rights and the most important observation of electrical phenomena.         Study outcomes and reference to the educational results for a field of study         Knowledge:	Lectur	e: - Classes	s: - Laboratory: <b>30</b>	Project/seminars:	2	
Education areas and fields of science and art       ECTS distribution (number and %)         Responsible for subject / lecturer:       prof. dr hab. inż. Wojciech Machczyński email: wojciech.machczynski@put.poznan.pl tel. 6652383         Wydział Elektryczny       ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge         2       Skills         3       Social competencies         3       Social competencies         Ability to use literature, solving linear equations, ability to operate on complex numbers, abilit to observe and draw conclusions.         3       Social competencies         Absumptions and objectives of the course:         Practical test circuit theory of rights and the most important observation of electrical phenomena.         Study outcomes and reference to the educational results for a field of study         Knowledge:	Status o	-			·	
and %)         Responsible for subject / lecturer:         prof. dr hab. inž. Wojciech Machczyński         email: wojciech.machczynski@put.poznan.pl         tel. 6652383         Wydział Elektryczny         ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge         8asic knowledge of mathematics and physics.         2       Skills         3       Social competencies         Ability to use literature, solving linear equations, ability to operate on complex numbers, abilit to observe and draw conclusions.         3       Social competencies         Ability to work in a team, attention to improving their own competence.         Ability to work in a team, attention of electrical phenomena.         Study outcomes and reference to the educational results for a field of study         Knowledge:			<b>X /</b>	(L	<i>'</i>	
prof. dr hab. inż. Wojciech Machczyński email: wojciech.machczynski@put.poznan.pl tel. 6652383 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań         Prereuisites in terms of knowledge, skills and social competencies:         1       Knowledge         8asic knowledge of mathematics and physics.         2       Skills         Ability to use literature, solving linear equations, ability to operate on complex numbers, abilit to observe and draw conclusions.         3       Social competencies         Assumptions and objectives of the course:         Practical test circuit theory of rights and the most important observation of electrical phenomena.         Study outcomes and reference to the educational results for a field of study         Knowledge:	Luucati					
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Competencies         Assumptions and objectives of the course:         Practical test circuit theory of rights and the most important observation of electrical phenomena.         Study outcomes and reference to the educational results for a field of study         Knowledge:	2	Skills				
Practical test circuit theory of rights and the most important observation of electrical phenomena.  Study outcomes and reference to the educational results for a field of study Knowledge:	3		Ability to work in a team, attentic	on to improving their own compet	ence.	
Knowledge:		• •		servation of electrical phenomena	а.	
<u> </u>			mes and reference to the	educational results for a	i field of study	
measurement of electrical, familiar with computational methods and tools necessary to analyze the results of the experiment [K_W11 +++]	1. It ha measu	s a basic knowledge c rement of electrical, fa				
Skills:						
1. It can be used properly chosen methods and measuring instruments and measure the relevant signals and based on the to designate the characteristics of electrical and information about their essential properties [K_U15 +++]						
<ul> <li>2. Able to develop the documentation and give a presentation on the results of a laboratory task [K_U03 ++]</li> <li>3. Able to work independently and in a team, is able to estimate the time needed to carry out the tasks commissioned [K_U02 ++]</li> </ul>	3. Able	to work independentl	• •	•		
Social competencies:						
<ol> <li>Understand the effects of non-technical aspects and engineering activities including its impact on the environment and the associated responsibility for decisions [K_K02 ++]</li> </ol>	1. Und	erstand the effects of	non-technical aspects and engine	ering activities including its impac	ct on the environment and the	

# Assessment methods of study outcomes

### Laboratory:

- test and favoring knowledge necessary for the accomplishment of problems in the area of laboratory tasks,
- continuous evaluation for each course rewarding gain skills they met the principles and methods
- assessment of knowledge and skills related to the implementation of the tasks your practice, the assessment report performed exercise
- rewarding ability to work in a team practice performing the task detailed in the laboratory,
- developed aesthetic rewarding diligence reports and tasks within their own learning.

# **Course description**

#### Laboratory:

The principles of superposition, proportional and mutual in electrical circuits. The theorems of Thevenin and Norton. The actual source of electrical energy, matching of receiver to source of electrical energy to maximum of power. RLC elements in sinusoidal alternating current circuits. The resonance in the serial circuits. The correction of load factor. The analysis of transient state in linear circuits. The symmetrical three-phase circuits. The analysis AC circuits with LC elements. Linear electric ciruits with periodic non-sinusoidal currents in steady state. The filters. The equivalent networks.

### Basic bibliography:

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

## Additional bibliography:

1. Skrypt Laboratorium Elektrotechniki teoretycznej, Wydawnictwo Politechniki Poznańskiej, Poznań 1998 wydanie VII.

- 2. Krakowski M.: Elektrotechnika teoretyczna. Tom 1. Obwody liniowe i nieliniowe?, PWN, Warszawa 1995.
- 3. Bolkowski S.: Teoria Obwodów Elektrycznych, WNT, Warszawa 1998.

# Result of average student's workload

Activity	Time (working hours)	
1. participation in laboratory classes	30	
2. participate in the consultations		5
3. preparation and development of laboratory reports	30	
Student's wo	rkload	
Source of workload	hours	ECTS
Total workload	65	2
Contact hours	35	1
Practical activities	60	2