

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Designig of a technical and economical</b>		Code <b>1010341551010324925</b>
Field of study <b>Mathematics</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>3 / 5</b>
Elective path/specialty <b>Mathematical Modelling</b>	Subject offered in: <b>polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time,part-time) <b>full-time</b>	
No. of hours Lecture: <b>2</b> Classes: <b>-</b> Laboratory: <b>3</b> Project/seminars: <b>-</b>		No. of credits <b>7</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>the sciences</b> <b>Mathematical sciences</b>		ECTS distribution (number and %) <b>7 100%</b> <b>7 100%</b>
<b>Responsible for subject / lecturer:</b>  Prof. dr hab. inż. Ryszard Nawrowski email: ryszard.nawrowski@put.poznan.pl tel. 616652788 Elektryczny ul. Piotrowo 3A, 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Information in Math, Physics on level of second degree of full time studies on academic field of Math.
2	<b>Skills</b>	The ability to understand and interpret of taught information and effective self-education in field related with chosen academic field.
3	<b>Social competencies</b>	Student has consciousness of necessity of expansion of his competences, he is ready to work individual and in workgroups.
<b>Assumptions and objectives of the course:</b> Introduction in methodology of designing technical system, mainly electrical systems, such as: direct current circuits, one- and three- phases alternating current circuits, magnetic coupled circuits, two-port network, electric filters, electric power lines and introduction of economic aspects of designing them.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. characterize principles of designing technical system (electric circuits), such as: direct and alternating current electric circuits, magnetic coupled circuits, two-ports networks, electric filters and electric power lines and characterize economic aspects of designing electrical devices - [K_W08+++, K_W12++] 2. identify and select methods of designing technical systems, mainly electrical systems - [K_W08++, K_W12+]		
<b>Skills:</b> 1. use knowledge in field of designing technical systems to realize projects in field of electrical engineering, such as: direct nad alternating current circuits, magnetic currents circuits, two-port networks, electric filters, electric power lines and make economic analysis of them - [K_U28+++, K_U35++, K_U37++] 2. find information from literature and Internet, work individual and in work groups, develop project documentation - [K_U28++, K_U35+, K_U37+]		
<b>Social competencies:</b> 1. think and operate in enterprising way in field of : designing selected technical systems, mainly electrical systems and economical analysis - [K_K01+++, K_K03++, K_K06++]		
<b>Assessment methods of study outcomes</b>		

<p>Lecture:</p> <ul style="list-style-type: none"> <li>- assess the knowledge and skills listed on the written and oral exam of the technical system design and economics.</li> </ul> <p>Lab classes:</p> <ul style="list-style-type: none"> <li>- to evaluate the skills of selected technical systems design, mostly electrical - checking skills on all classes and arbitrary individual project.</li> </ul> <p>Get extra points for the activity in the classroom, and in particular for:</p> <ul style="list-style-type: none"> <li>- propose to discuss additional aspects of the subject,</li> <li>- the effectiveness of the application of the knowledge gained during solving the given problem,</li> <li>- subsequent to the improvement of teaching materials,</li> <li>- developed aesthetic care projects,</li> <li>- the self-study.</li> </ul>		
<b>Course description</b>		
<p>Characterize particular of designing technical systems including: electric circuits such as: linear and non-linear direct current circuits, one- and three- phases alternating current circuits in steady and not steady state, magnetic coupled circuits, two-port networks, active and passive filters, electric power lines with distributes parameters and characterize economic aspects of designing electric devices.</p>		
<b>Basic bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Niestępski S.: "Instalacje elektryczne. Budowa. Projektowanie", Wydawnictwo Politechniki Warszawskiej, Warszawa 2005.</li> <li>2. Kurdziel R.: "Podstawy elektrotechniki", WNT, Warszawa 1973.</li> <li>3. Bolkowski S.: "Teoria obwodów elektrycznych", WNT, Warszawa 1998.</li> </ol>		
<b>Additional bibliography:</b>		
<ol style="list-style-type: none"> <li>1. Mikołajuk K., Trzaska Z.: "Zbiór zadań z elektrotechniki teoretycznej", WNT, Warszawa 1978.</li> <li>2. Szabatin J., Śliwa E.: "Zbiór zadań z teorii obwodów. Część 1", Wydawnictwo Politechniki Warszawskiej, Warszawa 1997.</li> </ol>		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. participation in lectures	30	
2. participation in laboratory classes	45	
3. participation in consultations for lectures	20	
4. participation in consultation for laboratory classes	30	
5. preparing to pass	20	
6. pass	3	
7. preparation laboratory and prepare reports	30	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	178	7
Contact hours	128	5
Practical activities	105	4