

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Electrical distribution apparatus</b>		Code <b>1010311261010315996</b>
Field of study <b>Electrical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>3 / 6</b>
Elective path/specialty <b>Distribution Devices and Electrical</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>1</b> Classes: <b>-</b> Laboratory: <b>1</b> Project/seminars: <b>-</b>		No. of credits <b>3</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>technical sciences</b>		ECTS distribution (number and %) <b>3 100%</b>
<b>Responsible for subject / lecturer:</b>  dr inż. Ryszard Batura email: ryszard.batura@put.poznan.pl tel. 061 665 2767 Wydział Elektryczny ul. Piotrowo 3A, 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Fundamentals of the electrical devices and measuring equipment and its application. Knowledge. Knowledge of the single- and three-phase AC systems and the electric power distribution system's structure.
2	<b>Skills</b>	Ability to acquire information from the literature in the field and other sources and to analyze it in evaluative way. Ability to deal with the analytical, simulation and experimental tools. 1c. Has understanding of the aspects and effects of the engineer's responsibility for made decisions. Is able to work in the team.
3	<b>Social competencies</b>	Has basic knowledge of the construction solutions, parameters and choice criterions of electric power switches, MV switchgears, bus bars and bus ducts. Is able to construct the test networks and to carry out the electric power devices tests.
<b>Assumptions and objectives of the course:</b> Has basic knowledge of the construction solutions, parameters and choice criterions of electric power switches, MV switchgears, bus bars and bus ducts. Is able to construct the test networks and to carry out the electric power devices tests.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Has knowledge about design, construction and operation principles of the electric power devices. - [K_W08 ++]		
<b>Skills:</b>		
1. Is able to apply properly the electric devices according to the general requirements and technical documentation. - [K_U23 ++]		
<b>Social competencies:</b>		
1. Is aware of the importance of his work and is ready to respect the team operation rules as well as to take responsibility for the task accomplished together. - [K_K03 +]		
<b>Assessment methods of study outcomes</b>		

<p>Lecture:                  ?Assessment of the knowledge and skills during the problem-type written examination,                  ?Continuous assessment, at each class (bonus for activity and perception quality).</p> <p>Laboratory:                  ?Test and bonus for a knowledge necessary to accomplish the problems posed in the lab task area,                  ?Assessment of the knowledge and skills related to the class task accomplishment, assessment of the lab report.</p> <p>Adding extra points for activity in discussions, especially for:                  ?effectiveness of implementation of the knowledge acquired when solving a given problem.                  ?ability to cooperate in the team accomplishing in practice a specific task in lab.                  ?remarks related to the educational materials? enhancement,                  ?care and esthetic form of the elaborated lab reports and designs ? within the individual work,</p>		
<b>Course description</b>		
<p>Distribution apparatus operating conditions ( environmental and in the system). Classification, functional types and basic ratings. Contact systems. Current-carrying capacity as well as the thermal and electro-dynamic influences in the current paths. Operating states? characteristics. (open status, switching-on, conducting and interrupting operations). Electric switching arc, arc quenching conditions and techniques in the different quenching environments. Arc quenching conditions and techniques in the low-oil, pneumatic (air and SF6), vacuum and magnetic blow-out circuit breakers, disconnectors and contactless switches (fuses).</p> <p>Laboratory subjects are related to those presented during lectures.</p>		
<b>Basic bibliography:</b>		
<p>1. Markiewicz H.: Urządzenia elektroenergetyczne, WNT, Warszawa, 2001                  2. Maksymiuk J.: Aparaty elektryczne, PWN, Warszawa, 1995.                  3. Flisowski Zd.: Technika wysokich napięć, WNT, Warszawa, 1999.                  4. Bolkowski St.: Teoria obwodów elektrycznych, WNT, Warszawa, 1995.</p>		
<b>Additional bibliography:</b>		
<p>1. Magazins Elektroinstalator, Elektroinfo.                  2. Related standards.                  3. Manufacturers? data sheets.                  4. Internet publications</p>		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. Lectures	15	
2. Laboratory	15	
3. Part in consultations	30	
4. The preparation to occupations, the study of laboratory documentation	30	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	90	3
Contact hours	60	2
Practical activities	30	1