

| STUDY MODULE DESCRIPTION FORM | | |
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| Name of the module/subject Electrical devices | | Code 1010324361010310067 |
| Field of study Electrical Engineering | Profile of study (general academic, practical) (brak) | Year /Semester 3 / 6 |
| 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: 10 Classes: - Laboratory: 10 Project/seminars: - | | No. of credits 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 art | | ECTS distribution (number and %) |
| Responsible for subject / lecturer: prof. dr hab. Aniela Kamińska-Benmechernene, prof. nadzw. email: anIELa.kaminska@put.poznan.pl tel. 61 665 26 67 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań | | |
| Prerequisites in terms of knowledge, skills and social competencies: | | |
| 1 | Knowledge | Basic knowledge on electrical engineering, mathematics, physics and electrical metrology. |
| 2 | Skills | Able to perform mathematical analysis of simple electrical circuits and read electrical wiring schemes. |
| 3 | Social competencies | A sense of the need to broaden the competence and willingness to work together in a team. |
| Assumptions and objectives of the course: Knowledge of phenomena occurring in electrical devices and systems as well as their mathematical and physical description. Purchase of skills in the application of phenomena description to design of power supply and hazard assessment that can occurs in these systems. Experiment planning, selection of measurement instrument, realization of test set-up, researches performing and results analyzing. | | |
| Study outcomes and reference to the educational results for a field of study | | |
| Knowledge: | | |
| 1. Know how describe phenomena occurring in electrical devices and power supply. - [K_W03 ++, K_W04+++ , K_W08 +++] 2. Know how describe phenomena occurring in electrical devices and power supply. - [K_W03 ++, K_W04+++ , K_W08 +++] 3. Know how formulate mathematical and physical description of phenomena: conductors and devices heating, electrodynamic effects, recovery voltages, switching arc and its extinction. - [K_W01 ++, K_W03 ++, K_W04 +++] | | |
| Skills: | | |
| 1. Able to analyze the mathematical and physical descriptions of phenomena for the different operating states and conditions. - [K_U10 ++, K_U11 +++] 2. Able to perform the calculation and estimation of hazard assessment occurring in electrical devices and power supply systems. - [K_U10 ++, K_U11 +++] 3. Able to plan experiment, measurement instrument select, test set-up realize, perform researches and analyze of results. - [K_U02+++ , K_U14+++] | | |
| Social competencies: | | |
| 1. A sense of influence of proper devices selection and analysis of phenomena on ensuring supply continuity to different electricity consumers. - [K_K01 +, K_K02 +++] 2. A sense of influence of phenomena and devices on the environment and the people working with electrical equipment and using them, and the consequent need for extensive cooperation both at the design stage and utilization. - [K_K02 +++ , K_K03 +++] | | |

| Assessment methods of study outcomes | | |
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| <p>Lecture:</p> <p>? skills assessment to analyze the description of phenomena for selected systems, conditions and assumptions,</p> <p>? assessment of knowledge and understanding of key terms.</p> <p>Laboratory exercises:</p> <p>? skills assessment of experiment planning,</p> <p>? skills assessment of the experimental set-up and devices selection,</p> <p>? assessment of the experiment carry out and the analyzing of results using modern methods and software,</p> <p>? assessment of the measurement accuracy analysis, physical and mathematical description and conclusions.</p> <p>Getting extra points for the activity during seminar, and in particular for:</p> <p>? proposing and analysis mathematical and physical phenomena in systems and conditions that were not discussed at the lecture,</p> <p>? proposing other models of phenomena and their analysis,</p> <p>? teamwork implementation of the extended experiment in a laboratory,</p> <p>? the use of modern methods to describe measurement results.</p> | | |
| Course description | | |
| <p>Heating of conductors by operating currents: determination of heating and cooling functions, steady state heating, heating by short circuit currents. Electrodynamics interactions: forces in parallel and perpendicular conductors, forces produced by alternating current and in busbar systems. Switching arc and its extinction: model of arc, DC and AC arc characteristics and extinction condition. Transient recovery voltage (TRV) in electric power systems: periodic and non-periodic TRV in one-frequency circuit and its parameters, TRV during switching in long line ? method of traveling waves.</p> | | |
| Basic bibliography: | | |
| Additional bibliography: | | |
| Result of average student's workload | | |
| Activity | Time (working hours) | |
| 1. participation in the class lecture | 10 | |
| 2. participation in the laboratory exercises | 10 | |
| 3. participation in the consulting on the lecture and laboratory exercises | 2 | |
| 4. preparation to the laboratory exercises | 4 | |
| 5. preparation of practical exercises report | 4 | |
| 6. preparation to the written exam | 10 | |
| Student's workload | | |
| Source of workload | hours | ECTS |
| Total workload | 40 | 2 |
| Contact hours | 22 | 1 |
| Practical activities | 14 | 1 |