

| <b>STUDY MODULE DESCRIPTION FORM</b>  |   |   |
|---|---|---|
| Name of the module/subject<br><b>Fundamentals of electricity and electronics</b>  |   | Code<br><b>1010311421010325572</b>  |
| Field of study<br><b>Power Engineering</b>  | Profile of study (general academic, practical)<br><b>(brak)</b> | Year /Semester<br><b>1 / 2</b>  |
| Elective path/specialty<br><b>-</b>   | Subject offered in:<br><b>Polish</b>                            | Course (compulsory, elective)<br><b>obligatory</b>  |
| Cycle of study:<br><b>First-cycle studies</b>   | Form of study (full-time, part-time)<br><b>full-time</b>        |   |
| No. of hours<br>Lecture: <b>30</b> Classes: <b>15</b> Laboratory: <b>30</b> Project/seminars: <b>-</b>  |   | No. of credits<br><b>5</b>  |
| Status of the course in the study program (Basic, major, other)<br><b>(brak)</b>  |   | (university-wide, from another field)<br><b>(brak)</b>  |
| Education areas and fields of science and art<br><b>technical sciences</b><br><b>Technical sciences</b>   |   | ECTS distribution (number and %)<br><b>5 100%</b><br><b>5 100%</b>  |
| <b>Responsible for subject / lecturer:</b><br><br>dr hab. inż. Andrzej Tomczewski<br>email: andrzej.tomczewski@put.poznan.pl<br>tel. 616652788<br>Elektryczny<br>ul. Piotrowo 3A, 60-965 Poznań   |   |   |
| <b>Prerequisites in terms of knowledge, skills and social competencies:</b>   |   |   |
| 1   | <b>Knowledge</b>  | Basic information form mathematics, physics, circuits theory at level of first semester of Energetics.  |
| 2   | <b>Skills</b>   | Skills in understanding and interpretation of information and effective self-education in field of science related with chosen academic discipline. |
| 3   | <b>Social competencies</b>                                      | Student should have consciousness of necessity of improving his competences, readiness to work individual and cooperate within groups.              |
| <b>Assumptions and objectives of the course:</b><br>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. Introduction of analytical methods of calculations for electric and electronic circuits and rules of connection and carrying on measurements.                                    |   |   |
| <b>Study outcomes and reference to the educational results for a field of study</b>   |   |   |
| <b>Knowledge:</b><br>1. describe electric and electronic circuits, describe and explain laws and methods of analysis of direct current circuits, one- or three-phase alternating current circuits, magnetic coupled circuits and simple electronic circuits - [K_W01++, K_W02++, K_W17+++]<br>2. recognize and select methods of analysis and testing of electrical and electronic circuits - [K_W01++, K_W02++]  |   |   |
| <b>Skills:</b><br>1. use knowledge in field of 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++]<br>2. get information from literature and web, work individual, solve exercises by his own, connect and carry on measurements of electric values in field of basic electrical engineering - [K_U01++, K_U02++, K_U06+, K_U10++] |   |   |
| <b>Social competencies:</b><br>1. think and operate in enterprising way in the field of analysis of electric and electronic circuits - [K_K01+, K_K02+, K_K04+]   |   |   |
| <b>Assessment methods of study outcomes</b>   |   |   |

Lecture:  
 - assess the knowledge and skills listed on the written and oral exam of basics of electrical engineering and electronics.

Auditorium exercises:  
 - assess skills of solving accounting exercises in range of analysis of electric and electronic circuits ? verification skills on every exercises and two tests during the semester.

Lab classes:  
 - 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.

Obtaining additional points for activity during exercises, in particular way for:  
 - 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 homework.

**Course description**

Electric signals and classification, basic definitions in field of electrical engineering and electronic, elements of electric circuits, arrow convention for the voltage and the 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: Norton?s theorem, Thevenin?s theorem, Tellegen?s theorem), real power, reactive power an complex power, energy in electric circuits, maximum power transfer theorem, magnetic coupled circuits, resonance effect, measurements of power and energy in electric circuits Solving accounting tasks in field of analysis of direct current circuits, one- and three-phase alternating current circuits. Elements of electronic circuits.

**Basic bibliography:**

**Additional bibliography:**

**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                             | 30                   |
| 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          | 5                    |
| 7. preparation for the auditorium exercises                   | 10                   |
| 8. homeworks  | 10                   |
| 9. preparation for the lab classes and making reports         | 25                   |
| 10. preparation for the exam                                  | 20                   |
| 11. preparation for the auditorium exercises pass             | 10                   |
| 12. participation in the exam                                 | 5                    |

**Student's workload**

| Source of workload   | hours | ECTS |
|----------------------|-------|------|
| Total workload       | 170   | 5    |
| Contact hours        | 95    | 4    |
| Practical activities | 60    | 3    |