



Subject card

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|---|--|--|---|-------------------------------------|--|------------|-----|
| Subject name and code | Electronics and electrotechnics, PG_00060844 | | | | | | |
| Field of study | Chemical Technology | | | | | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | | | 2024/2025 | | |
| Education level | first-cycle studies | Subject group | | | Obligatory subject group in the field of study | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 1 | Language of instruction | | | Polish | | |
| Semester of study | 2 | ECTS credits | | | 2.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Department of Physical Chemistry -> Faculty of Chemistry | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr inż. Mateusz Kogut | | | | |
| | Teachers | | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 0.0 | 15.0 | 0.0 | 0.0 | 30 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 30 | | 2.0 | | 18.0 | 50 |
| Subject objectives | The purpose of the course is to prepare non-electronic engineers to work with specialists in the field. This need arises from the increasing unification of science and technology. Apparatus used in chemical technology and biotechnology, in addition to the use of physical and chemical phenomena, requires basic knowledge of the operation of electronic systems. The combination of all the above-mentioned disciplines will allow conscious planning of work and analysis of chemical and biological samples. The content of the course also addresses practical issues regarding the use of electricity. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_K03] is aware of the responsibility for his/her own work and is ready to follow the rules of teamwork and take responsibility for the tasks performed jointly | | The student is able to design a part of a larger electronic system and is able to do so safely anticipating potential dangers to the user. | | [SK1] Assessment of group work skills [SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice | | |
| | [K6_W10] Has knowledge in the areas of electrical engineering, electronics, automation and computer science. He knows the principles of operation of control and measurement systems and electronic control systems | | The student has the basic knowledge of electrical engineering and electronics to cooperate in the design of automation components in technological processes. | | [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge | | |
| | [K6_U10] is able to select elements of automatic control systems for simple technological processes. Is able to use computer programmes supporting the implementation of tasks typical of control and optimisation of chemical processes | | The student is able to decide which elements are needed for process automation. | | [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task | | |

| Subject contents | <p>The content of the course has been selected so that students, after completing this course, will more fully apply their knowledge in other fields. Particular emphasis has been placed on the practical aspect allowing for later work not only in biological and chemical laboratories, but also in positions closely related to industrial production. The primary method used to impart knowledge will be the use of basic mathematics and physics information to analyze the results of measurements. The course framework includes: Basic issues - hydraulic analogy of an electric circuit. Ohm's law, internal resistance of a current source. How to read and draw electrical diagrams. Line voltage, three-phase current. Work, power, effective power. Basic electronic components - resistors, designations, basic parameters. Kirchhoff's first and second laws. Capacitors - technical parameters. The use of capacitors in the construction of integrating and differentiating circuits. Diodes - construction of semiconductor circuits. Types of diodes (rectifier diodes, Zener diodes, LEDs, RGB). Single- and double-voltage rectifiers, Graetz bridge. Stabilizers (circuits with capacitor, Zener diode, transistor, monolithic stabilizers). Bipolar transistors (construction, characteristics, operating states, circuits). Operational amplifiers (example applications). Digital technology (TTL/CMOS technology). Microcontrollers - basic knowledge. Application of piezoelectric elements. Biosensors. Temperature measurement and control. DC motors and generators, AC motors. Power regulators. Transmission of electric power. Laboratory classes will consist of the following exercises: Testing of DC machines. Measurement of resistance. Diodes and transistors. Rectifier systems and voltage stabilizers. Electrical measurement of non-electrical quantities. Digital integrated circuits. Thyristor power regulator</p> | | | | | | | | | | | | | | |
|--|--|--|--|--------------------------|-------------------|-------------------------------|--|-------|-------|--|--------|-------|--|-------|-------|
| Prerequisites and co-requisites | Basic knowledge of mathematics and physics. | | | | | | | | | | | | | | |
| Assessment methods and criteria | <table border="1" data-bbox="451 600 1487 734"> <thead> <tr> <th data-bbox="451 600 798 633">Subject passing criteria</th> <th data-bbox="805 600 1141 633">Passing threshold</th> <th data-bbox="1149 600 1487 633">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 645 798 678"></td> <td data-bbox="805 645 1141 678">60.0%</td> <td data-bbox="1149 645 1487 678">20.0%</td> </tr> <tr> <td data-bbox="451 689 798 723"></td> <td data-bbox="805 689 1141 723">100.0%</td> <td data-bbox="1149 689 1487 723">20.0%</td> </tr> <tr> <td data-bbox="451 734 798 768"></td> <td data-bbox="805 734 1141 768">50.0%</td> <td data-bbox="1149 734 1487 768">60.0%</td> </tr> </tbody> </table> | | | Subject passing criteria | Passing threshold | Percentage of the final grade | | 60.0% | 20.0% | | 100.0% | 20.0% | | 50.0% | 60.0% |
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| | 50.0% | 60.0% | | | | | | | | | | | | | |
| Recommended reading | Basic literature | <p>1) Paul Horowitz, Winfield Hill, Sztuka elektroniki cz. 1-2, Wydawnictwo WKŁ, Warszawa 2013</p> <p>2) Paweł Hempowicz, "Elektrotechnika i elektronika dla nieelektryków", Wydawnictwo WNT, Warszawa, 1999</p> <p>3) Miesięcznik Elektronika dla Wszystkich, Wydawnictwo AVT</p> | | | | | | | | | | | | | |
| | Supplementary literature | 1) Cathleen Shamieh, Elektronika dla bystrzaków., Septem, Gliwice 2017 | | | | | | | | | | | | | |
| | eResources addresses | Adresy na platformie eNauczanie: | | | | | | | | | | | | | |
| Example issues/ example questions/ tasks being completed | | | | | | | | | | | | | | | |
| Work placement | Not applicable | | | | | | | | | | | | | | |