



Subject card

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|---|---|---|--|-------------------------------------|--|------------|-----|
| Subject name and code | Automatics Equipment, PG_00038096 | | | | | | |
| Field of study | Automation, Robotics and Control Systems | | | | | | |
| Date of commencement of studies | October 2023 | Academic year of realisation of subject | | | 2024/2025 | | |
| Education level | first-cycle studies | Subject group | | | Obligatory subject group in the field of study Subject group related to scientific research in the field of study | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 2 | Language of instruction | | | Polish lack | | |
| Semester of study | 4 | ECTS credits | | | 4.0 | | |
| Learning profile | general academic profile | Assessment form | | | exam | | |
| Conducting unit | Department of Biomechanics -> Faculty of Electrical and Control Engineering | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | prof. dr hab. inż. Grzegorz Redlarski | | | | |
| | Teachers | | dr inż. lek. Piotr Tojza dr inż. Mariusz Dąbkowski | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 0.0 | 15.0 | 0.0 | 0.0 | 45 |
| | 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 | 45 | | 4.0 | | 51.0 | 100 |
| Subject objectives | Acquiring knowledge, skills and competences related to the operation and exploitation of automation and robotics devices. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W07] has basic knowledge related to control and automation systems | | Analyzes, designs, selects and configures industrial automation devices. | | [SW1] Assessment of factual knowledge | | |
| | [K6_K04] can react in abnormal and emergency situations, threats to health and life when using automation and robotics components and systems | | Safely operates automation devices and responds to disruptions and emergency situations. | | [SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice | | |
| [K6_U07] can build and analyze models of systems and systems in the field related to control systems and automation | | Develops mathematical models and designs automation devices tailored to specific needs. | | [SU1] Assessment of task fulfilment | | | |

| Subject contents | <p>Lecture: Introduction; basic terms, groups. Requirements for automation devices. Description methods; static and dynamic characteristics of automation elements. Systematization of automation devices. General characteristics of electrical automation devices. Robotics elements: construction of industrial robots, serial and parallel kinematic diagrams, gripping heads. Applications of robots in industry. Electric actuators: construction, principle of operation, materials, static and dynamic characteristics, design issues. DC servomotors: types, construction, static and dynamic characteristics, control. AC servomotors: types, construction, static and dynamic characteristics, control. Stepper motors: types, construction, principle of operation, static and dynamic properties, control of stepper motors. Pneumatic automation devices: general characteristics, preparation of supply air and auxiliary equipment, methods of describing dynamic properties (examples), force elements and elements realizing displacement. Basic measuring elements of mechanical automation devices. Pneumatic cascade. Pneumatic regulators. Pneumatic power amplifiers, controllers, pneumatic actuators, valves. Hydraulic automation devices: advantages and disadvantages, types of working media, power stations, distributors, actuators. Formulation of WT - requirements, certification tests, acceptance tests of automation devices. The influence of external factors on automation devices. Analysis of an example automation device.</p> <p>Laboratory: A series of exercises demonstrating in a practical way the issues presented during the lecture.</p> | | | | | | | | | | | |
|--|--|---|--|--------------------------|-------------------|-------------------------------|----------|-------|-------|------------|-------|-------|
| Prerequisites and co-requisites | Basics of electrical engineering and metrology. | | | | | | | | | | | |
| Assessment methods and criteria | <table border="1"> <thead> <tr> <th data-bbox="451 629 794 667">Subject passing criteria</th> <th data-bbox="794 629 1137 667">Passing threshold</th> <th data-bbox="1137 629 1487 667">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 667 794 696">Lectures</td> <td data-bbox="794 667 1137 696">60.0%</td> <td data-bbox="1137 667 1487 696">60.0%</td> </tr> <tr> <td data-bbox="451 696 794 734">Laboratory</td> <td data-bbox="794 696 1137 734">60.0%</td> <td data-bbox="1137 696 1487 734">40.0%</td> </tr> </tbody> </table> | | | Subject passing criteria | Passing threshold | Percentage of the final grade | Lectures | 60.0% | 60.0% | Laboratory | 60.0% | 40.0% |
| Subject passing criteria | Passing threshold | Percentage of the final grade | | | | | | | | | | |
| Lectures | 60.0% | 60.0% | | | | | | | | | | |
| Laboratory | 60.0% | 40.0% | | | | | | | | | | |
| Recommended reading | Basic literature | <ol style="list-style-type: none"> 1. Skrypt do laboratorium pod red. A. Grono: Mechatronika. Gdańsk 2008. Wydawnictwo Politechniki Gdańskiej. 2. Parr, Andrew E.: Hydraulics and Pneumatics: a technicians and engineers guide. Oxford: Butterworth-Heinemann, 2000. | | | | | | | | | | |
| | Supplementary literature | 1. Kostro J.: <i>Elementy, urządzenia i układy automatyki</i> , WSiP, Warszawa 1998. | | | | | | | | | | |
| | eResources addresses | Adresy na platformie eNauczenie: Urządzenia Automatyki [2024/25] - Moodle ID: 43841 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=43841 | | | | | | | | | | |
| Example issues/ example questions/ tasks being completed | <ol style="list-style-type: none"> 1. Structures and types of automation devices. 2. The automation devices in electric power systems. 3. Hydraulic and pneumatic devices and systems. 4. Communications between automation devices and systems. 5. Design methodology of selected automation systems. | | | | | | | | | | | |
| Work placement | Not applicable | | | | | | | | | | | |

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