



Subject card

|   |  |  |                             |                                     |  |            |     |
|---|--|--|-----------------------------|-------------------------------------|--|------------|-----|
| Subject name and code                       | Actuators in Control Systems - laboratory, PG_00047582   |  |                             |                                     |  |            |     |
| Field of study                              | Automatic Control, Cybernetics and Robotics  |  |                             |                                     |  |            |     |
| Date of commencement of studies             | October 2024   | Academic year of realisation of subject                  |                             |                                     | 2025/2026  |            |     |
| Education level                             | first-cycle studies  | Subject group  |                             |                                     | Obligatory subject group in the field of study<br>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   |            |     |
| Semester of study                           | 4  | ECTS credits   |                             |                                     | 1.0  |            |     |
| Learning profile                            | general academic profile   | Assessment form  |                             |                                     | assessment   |            |     |
| Conducting unit                             | Department of Marine Electronic Systems -> Faculty of Electronics, Telecommunications and Informatics  |  |                             |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor   |  | mgr inż. Aleksander Schmidt |                                     |  |            |     |
|   | Teachers   |  | mgr inż. Aleksander Schmidt |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type  | Lecture  | Tutorial                    | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours  | 0.0  | 0.0                         | 15.0                                | 0.0  | 0.0        | 15  |
|   | 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  | 15   |                             | 1.0                                 |  | 9.0        | 25  |
| Subject objectives                          | To get to know basic parameters and features of actuators - i.e. the commutated DC engines and BLDC engines, stepping motors and relays (contact and non contact switching devices) - and methods of their measurement . |  |                             |                                     |  |            |     |

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| Learning outcomes  | Course outcome   | Subject outcome  | Method of verification   |
|  | [K6_U21] can individually carry out an analysis of a managing and controlling problem and is able to individually design, tune and operate automatic regulation and control systems, and use computers to control and monitor dynamic systems  | The student has knowledge about a methods of design and operation automation systems using executive elements.   | [SU4] Assessment of ability to use methods and tools                 |
|  | [K6_U02] can perform tasks related to the field of study in an innovative way as well as solve complex and nontypical problems, applying knowledge of physics, in changing and not fully predictable conditions  | The student has knowledge about principles of operation executive elements.  | [SU3] Assessment of ability to use knowledge gained from the subject |
|  | [K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment   | The student knows the functionalities of existing technical solutions related to the field of study.   | [SU2] Assessment of ability to analyse information                   |
|  | [K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment | Student is able to make a simple design of device or system design according to the given specification.   | [SU4] Assessment of ability to use methods and tools                 |
| Subject contents   | 1. Measurements of fundamental parameters of contact and non contact switching devices<br>2. Parameters of discrete drive with stepping motor (controller types, full-, half-, and micro-step work)<br>3. Testing of dynamic characteristics of electric DC servo-motor<br>4. Analysis of electric motors rotational speed controller  |  |  |
| Prerequisites and co-requisites                                |  |  |  |
| Assessment methods and criteria                                | Subject passing criteria   | Passing threshold  | Percentage of the final grade  |
|  | Reports of laboratory exercises  | 50.0%  | 100.0%   |
| Recommended reading  | Basic literature   | 1. Jerzy Kostro "Elementy, urządzenia i układy automatyki" - Czytelnia na Wydziale ETI<br>2. Silniki krokowe i sterowniki silników krokowych. Instrukcja obsługi sterownika SMC64 - opis w sieci <a href="http://www.wobit.com.pl">http://www.wobit.com.pl</a> .<br>3. Dane katalogowe przekaźników półprzewodnikowych SSR ( <a href="http://sharp-world.com">http://sharp-world.com</a> ; <a href="http://www.irf.com">http://www.irf.com</a> ) |  |
|  | Supplementary literature   | No requirements  |  |
|  | eResources addresses   | Adresy na platformie eNauczanie:   |  |
| Example issues/<br>example questions/<br>tasks being completed | 1. Measurement of DC motor dynamic characteristics<br><br>2. Advantages and disadvantages of micro-step operation of a two-phase, hybrid stepper motor.<br><br>3. Basic differences of mechanical and semiconductor relays.  |  |  |
| Work placement   | Not applicable   |  |  |

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