



## Subject card

|   |  |  |   |                                     |  |            |     |
|---|--|--|---|-------------------------------------|--|------------|-----|
| Subject name and code                       | , PG_00056132  |  |   |                                     |  |            |     |
| Field of study                              | Mechatronics   |  |   |                                     |  |            |     |
| Date of commencement of studies             | October 2023   |  | Academic year of realisation of subject   |                                     | 2025/2026  |            |     |
| Education level                             | first-cycle studies  |  | Subject group   |                                     |  |            |     |
| Mode of study                               | Full-time studies  |  | Mode of delivery  |                                     | at the university  |            |     |
| Year of study                               | 3  |  | Language of instruction   |                                     | Polish   |            |     |
| Semester of study                           | 6  |  | ECTS credits  |                                     | 2.0  |            |     |
| Learning profile                            | general academic profile   |  | Assessment form   |                                     | assessment   |            |     |
| Conducting unit                             | Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology   |  |   |                                     |  |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor   |  | dr inż. Wiktor Sieklicki  |                                     |  |            |     |
|   | 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   |   | 0.0                                 |  | 0.0        | 30  |
| Subject objectives                          | Delivering to the students knowledge about various types of physical quantities converters (sensors) used in mechatronic systems   |  |   |                                     |  |            |     |
| Learning outcomes                           | Course outcome   |  | Subject outcome   |                                     | Method of verification   |            |     |
|   | [K6_W11] has knowledge about the life cycle of mechatronic systems and objects   |  | Student presents phases of design and development of measurement systems  |                                     | [SW1] Assessment of factual knowledge                                |            |     |
|   | [K6_W10] has knowledge about development trends in the field of engineering and technology sciences and scientific disciplines: Mechanical Engineering, Automation, Electronics, Electrical Engineering and Space Technologies, adequate for Mechatronics curse  |  | Student presents types of sensors utilized in modern mechatronics systems   |                                     | [SW3] Assessment of knowledge contained in written work and projects |            |     |
|   | [K6_U05] is able to use properly chosen tools to compare design solutions of elements and mechatronics systems according to given application and economic criteria (e.g. power demand, speed, costs)  |  | Student chooses suitable types of sensors according to the given measurement task   |                                     | [SU1] Assessment of task fulfilment                                  |            |     |
|   | [K6_U06] is able to identify and formulate specification of simple, practical engineering tasks, distinctive for mechatronics  |  | Student formulates specification of simple measurement system   |                                     | [SU3] Assessment of ability to use knowledge gained from the subject |            |     |
|   | [K6_W08] knows and understands design and production processes of elements and simple mechatronic devices  |  | Student describes process of elements selections and conditions that must be met by measurement systems dedicated to a given task |                                     | [SW3] Assessment of knowledge contained in written work and projects |            |     |
| Subject contents                            | Presenting operation principles, structure and applications of the most important types of tranducers / sensors, e.g. displacements, velocity, acceleration, distance, strain, temperature, etc. sensors concentrating especially on types of sensors not presented to students during preceding courses. During laboratory exercises - performing measurement tasks with selected types of sensors. |  |   |                                     |  |            |     |
| Prerequisites and co-requisites             | Knowledge of topics from "Metrology and measurement systems", "Basics of digital signal processing" and "Elements of mechatonic systems" courses   |  |   |                                     |  |            |     |

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| Assessment methods and criteria                                | Subject passing criteria  | Passing threshold   | Percentage of the final grade |
|  | Finishing task given during laboratory classes                                | 50.0%   | 35.0%                         |
|  | Written test  | 55.0%   | 65.0%                         |
| Recommended reading  | Basic literature  | J. Fraden, Handbook of Modern Sensors: Physics, Designs, and Applications, Springer, 2016 |                               |
|  | Supplementary literature  | Technical documentation of various types of sensors                                       |                               |
|  | eResources addresses  | Adresy na platformie eNauczanie:  |                               |
| Example issues/<br>example questions/<br>tasks being completed | Select elements need for measurement of a given physical phenomena / quantity |   |                               |
|  | Describe structure and operation principles of a given sensor type            |   |                               |
| Work placement   | Not applicable  |   |                               |