



## Subject card

|   |   |  |   |                                     |  |            |     |
|---|---|--|---|-------------------------------------|--|------------|-----|
| Subject name and code                       | Mechatronics, PG_00055398   |  |   |                                     |  |            |     |
| Field of study                              | Mechanical Engineering  |  |   |                                     |  |            |     |
| Date of commencement of studies             | October 2023  | 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                               | 3   | Language of instruction                                  |   |                                     | Polish   |            |     |
| Semester of study                           | 5   | ECTS credits   |   |                                     | 3.0  |            |     |
| 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 hab. inż. Piotr Mioduszewski                          |   |                                     |  |            |     |
|   | Teachers  |  |   |                                     |  |            |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial  | Laboratory                          | Project  | Seminar    | SUM |
|   | Number of study hours   | 30.0   | 0.0   | 30.0                                | 0.0  | 0.0        | 60  |
|   | 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   | 60   |   | 3.0                                 |  | 12.0       | 75  |
| Subject objectives                          | Providing students with essential knowledge about mechatronics as well as design methods, modelling and exploitation of mechatronic systems   |  |   |                                     |  |            |     |
| Learning outcomes                           | Course outcome  |  | Subject outcome   |                                     | Method of verification   |            |     |
|   | [K6_W10] possesses knowledge on electronics and electrical engineering  |  | Student applies theoretically supported, general knowledge in the field of electrotechnics and electronics in the design of mechatronic systems |                                     | [SW1] Assessment of factual knowledge  |            |     |
|   | [K6_W06] possesses knowledge on automatics and robotics of mechanical systems   |  | Student analyses control systems for mechatronic devices  |                                     | [SW3] Assessment of knowledge contained in written work and projects   |            |     |
|   | [K6_U05] is able to plant an experiment within the range of measuring the basic operating parameters of mechanical devices using a specialized equipment, interpret the results and reach the correct conclusions |  | Student models and programs measurement and control systems for mechatronic devices   |                                     | [SU1] Assessment of task fulfilment  |            |     |

| Subject contents   | <p>Basic definitions in the field of mechatronics</p> <p>Essential problems of mechatronics design</p> <p>Interdisciplinary approach to mechatronics design.</p> <p>Methods and examples of mechatronic design</p> <p>Integration of mechanics, electrotechnics, electronics, hydraulics, actuators, controls and software in mechatronic systems</p> <p>Signal processing and analysis .</p> <p>Modelling of mechatronic systems elements.</p> <p>Design and exploitation of mechatronics systems</p> <p>Functions and functionality of modules and elements of mechatronic systems</p> <p>Laboratory:</p> <ul style="list-style-type: none"> <li>- modelling of mechatronic systems elements</li> <li>- mechatronic actuators</li> <li>- programming of the didactic mechatronic system</li> </ul>  |                               |  |                          |   |                               |  |  |       |                      |                                  |       |
|--|---|-------------------------------|--|--------------------------|---|-------------------------------|--|--|-------|----------------------|----------------------------------|-------|
| Prerequisites and co-requisites                          |   |                               |  |                          |   |                               |  |  |       |                      |                                  |       |
| Assessment methods and criteria                          | <table border="1"> <thead> <tr> <th data-bbox="456 1294 794 1323">Subject passing criteria</th> <th data-bbox="794 1294 1145 1323">Passing threshold</th> <th data-bbox="1145 1294 1479 1323">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1330 794 1382">Finishing of tasks given during laboratory classes</td> <td data-bbox="794 1330 1145 1382">55.0%</td> <td data-bbox="1145 1330 1479 1382">40.0%</td> </tr> <tr> <td data-bbox="456 1388 794 1413">Written test</td> <td data-bbox="794 1388 1145 1413">55.0%</td> <td data-bbox="1145 1388 1479 1413">60.0%</td> </tr> </tbody> </table>   |                               |  | Subject passing criteria | Passing threshold   | Percentage of the final grade | Finishing of tasks given during laboratory classes | 55.0%  | 40.0% | Written test         | 55.0%                            | 60.0% |
| Subject passing criteria                                 | Passing threshold   | Percentage of the final grade |  |                          |   |                               |  |  |       |                      |                                  |       |
| Finishing of tasks given during laboratory classes       | 55.0%   | 40.0%                         |  |                          |   |                               |  |  |       |                      |                                  |       |
| Written test   | 55.0%   | 60.0%                         |  |                          |   |                               |  |  |       |                      |                                  |       |
| Recommended reading                                      | <table border="1"> <tbody> <tr> <td data-bbox="456 1429 794 1525">Basic literature</td> <td colspan="2" data-bbox="794 1429 1479 1525">Heimann B., Gerth W., Popp K.: Mechatronika. Komponenty metody przykłady. Warszawa: Wyd. Nauk. PWN 2001.<br/>Gawrysiak M.: Mechatronika i projektowanie mechatroniczne. Białystok: Wyd. Polit. Białostockiej 1997 (dostępna w internecie).</td> </tr> <tr> <td data-bbox="456 1532 794 1675">Supplementary literature</td> <td colspan="2" data-bbox="794 1532 1479 1675">Kaliński K.: Nadzorowanie procesów dynamicznych w układach mechanicznych. Gdańsk: Wydawnictwo Politechniki Gdańskiej 2012.<br/>Petko M.: Wybrane metody projektowania mechatronicznego. Wydawnictwo Naukowe Instytutu Technologii Eksploatacji. Radom 2008.</td> </tr> <tr> <td data-bbox="456 1682 794 1715">eResources addresses</td> <td colspan="2" data-bbox="794 1682 1479 1715">Adresy na platformie eNauczanie:</td> </tr> </tbody> </table> |                               |  | Basic literature         | Heimann B., Gerth W., Popp K.: Mechatronika. Komponenty metody przykłady. Warszawa: Wyd. Nauk. PWN 2001.<br>Gawrysiak M.: Mechatronika i projektowanie mechatroniczne. Białystok: Wyd. Polit. Białostockiej 1997 (dostępna w internecie). |                               | Supplementary literature                           | Kaliński K.: Nadzorowanie procesów dynamicznych w układach mechanicznych. Gdańsk: Wydawnictwo Politechniki Gdańskiej 2012.<br>Petko M.: Wybrane metody projektowania mechatronicznego. Wydawnictwo Naukowe Instytutu Technologii Eksploatacji. Radom 2008. |       | eResources addresses | Adresy na platformie eNauczanie: |       |
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| eResources addresses                                     | Adresy na platformie eNauczanie:  |                               |  |                          |   |                               |  |  |       |                      |                                  |       |
| Example issues/ example questions/ tasks being completed | Exemplary questions / tasks will be presented to the student at least 4 weeks ahead of the final tests.   |                               |  |                          |   |                               |  |  |       |                      |                                  |       |
| Work placement   | Not applicable  |                               |  |                          |   |                               |  |  |       |                      |                                  |       |

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