# Subject card

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| Subject name and code | Fundamentals of Automatics, PG_00055288 |
| Field of study | Transport and Logistics |

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| Date of commencement of studies | October 2021 | Academic year of realisation of subject | 2022/2023 |
| 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 | 4.0 |
| Learning profile | general academic profile | Assessment form | assessment |

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| Conducting unit | Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology |

| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Mohammad Ghaemi |
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| | Teachers | dr inż. Mohammad Ghaemi |
| | | mgr inż. Damian Jakowski |

| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|---|
| | Number of study hours | 30.0 | 15.0 | 0.0 | 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 | 10.0 | 45.0 | 100 |

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| Subject objectives | The objective is to learn the fundamentals of control theory and the structures and elements of basic automation systems, as well as general information about control system design. |

| Learning outcomes | Course outcome | Subject outcome | Method of verification |
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| | [K6_W04] has a basic knowledge in IT, electronics, automation and control, computer graphics useful to understand the possibilities of their application in transport | The student is able to assess usefulness of typical methods and tools applied in engineering to select the proper method and tool for solving the simple problems in the range of control system | [SW1] Assessment of factual knowledge<br>[SW3] Assessment of knowledge contained in written work and projects |
| | [K6_U05] can formulate a simple engineering task and its specification within the range of design, construction and operation of means and systems of transport | The student is able to formulate simple engineering problems and its specification in the range of automatics and robotics | [SU1] Assessment of task fulfilment<br>[SU3] Assessment of ability to use knowledge gained from the subject |

| Subject contents | 1.  Introduction and basic concepts |
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| | 2. Classification of control systems |
| | 3. Modeling of dynamic systems and description of elements of automatic control systems |
| | 4. Types of mathematical models of dynamic systems: differential equation, transmittance, block diagram, linearization |
| | 5. Transition function and time characteristics |
| | 6.Feedback |
| | 7.Analysis of time-domain and frequency-domain control systems |
| | 8.Stability of linear control systems |
| | 9. Controlls |

| Prerequisites and co-requisites | Pre-requisite subjects: |
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| | 1. Mathematics |
| | 2. Physics |

| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| --- | --- | --- | --- |
| | Colloquium for credit from exercises | 51.0% | 34.0% |
| | Colloquium for credit from lecture | 56.0% | 66.0% |

| Recommended reading | Basic literature | Nise N. S., Control System Engineering, 8th Edition, John Whiley & Sons Inc., 2019. |
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| | Supplementary literature | - Bubnicki Z., Teoria i algorytmy sterowania, Wydawnictwo Naukowe PWN, Warszawa, 2019. |
| | | - Domachowski Z., Automatyka i robotyka podstawy, Wydawnictwo PG, Gdańsk, 2003. |
| | | - Friedland B., Control System Design, McGraw Hill Co., 1986. |
| | | - Kaczorek T., Podstawy teorii sterowania, Wydawnictwo Naukowe PWN, Warszawa, 2020. |
| | | - Ogata K., Modern Control Engineering, 4th edition, Prentice-Hall, 2009. |
| | | - Perycz S., Podstawy automatyki, skrypt dla Instytutu Okrętowego PG, Gdańsk, 1983. |
| | | - Próchnicki W., Dzida M., Zbiór zadań z podstaw automatyki, skrypt dla studentów Wydziału Oceanotechniki i Okrętownictwa PG, Gdańsk, 1993. |
| | | - Raven, F. H., Automatic control engineering, McGraw Hill Co., 1986. |
| | eResources addresses | Uzupełniające<br>Adresy na platformie eNauczanie: |

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| Example issues/ example questions/ tasks being completed | |
| Work placement | Not applicable |