



## Subject card

|   |   |  |   |                                     |         |  |     |
|---|---|--|---|-------------------------------------|---------|--|-----|
| Subject name and code                       | Navigation Systems, PG_00048381   |  |   |                                     |         |  |     |
| Field of study                              | Electronics and Telecommunications  |  |   |                                     |         |  |     |
| Date of commencement of studies             | February 2023   |  | Academic year of realisation of subject |                                     |         | 2022/2023  |     |
| Education level                             | second-cycle studies  |  | Subject group                           |                                     |         | Optional subject group<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                               | 1   |  | Language of instruction                 |                                     |         | Polish   |     |
| Semester of study                           | 1   |  | ECTS credits                            |                                     |         | 2.0  |     |
| 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  |  | dr hab. inż. Jacek Marszał              |                                     |         |  |     |
|   | Teachers  |  | dr hab. inż. Jacek Marszał              |                                     |         |  |     |
| Lesson types and methods of instruction     | Lesson type   | Lecture  | Tutorial                                | Laboratory                          | Project | Seminar  | SUM |
|   | Number of study hours   | 30.0   | 0.0                                     | 0.0                                 | 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   |   | 4.0                                 |         | 16.0   | 50  |
| Subject objectives                          | Overview of topics characterizing the principles of operation and structure of marine navigation, communications, radar and sonar systems, which are electronic equipment of vessels, divided into mandatory systems - due to the IMO conventions relating to the safety at sea, and utility ones - used in offshore activity |  |   |                                     |         |  |     |

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| Learning outcomes  | Course outcome  | Subject outcome  | Method of verification   |
|  | [K7_W03] Knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum.  | Student defines tasks and basic concepts of navigation. He discusses mapping methods and maps. He classifies and describes the classical methods of navigation and technical methods for their implementation. He presents the work principles and performance of navigation devices. He explains principles of work and gives the parameters of satellite navigation system GPS. He discusses principles of functioning of hydroacoustic navigation systems and their applications. He describes the operation of ILS in aviation navigation. | [SW3] Assessment of knowledge contained in written work and projects |
|  | [K7_W06] Knows and understands, to an increased extent, the basic processes taking place in the life cycle of devices, facilities and technical systems.  | Student defines tasks and basic concepts of navigation. He discusses mapping methods and maps. He classifies and describes the classical methods of navigation and technical methods for their implementation. He presents the work principles and performance of navigation devices. He explains principles of work and gives the parameters of satellite navigation system GPS. He discusses principles of functioning of hydroacoustic navigation systems and their applications. He describes the operation of ILS in aviation navigation. | [SW1] Assessment of factual knowledge                                |
| Subject contents   | <ol style="list-style-type: none"><li>1. Introduction and legal framework for action at sea: IMO, SOLAS</li><li>2. Marine navigation systems, models of the Earth, the coordinates</li><li>3. Mapping systems, digital map, data formats</li><li>4. Directions to navigation</li><li>5. GPS Navigation System</li><li>6. Maritime real-time systems - implementation in Poland</li><li>7. The automatic identification of ships AIS-PL</li><li>8. Stations Maritime Differential GPS (DGPS-PL)</li><li>9. Marine communication systems, GMDSS system</li><li>10. Internal communication systems and alarm systems on ships</li><li>11. Marine echolocation systems - marine radar, ARPA system, echo sounders, sonars</li><li>12. Hydroacoustic systems - environmental conditions of operation</li><li>13. Underwater communication systems</li><li>14. Local navigation systems, positioning and stabilization of the position</li><li>15. Summary - mandatory navigation equipment</li></ol> |  |  |
| Prerequisites and co-requisites                                |   |  |  |
| Assessment methods and criteria                                | Subject passing criteria  | Passing threshold  | Percentage of the final grade  |
|  | test colloquium   | 50.0%  | 70.0%  |
|  | presence & activity   | 0.0%   | 30.0%  |
| Recommended reading  | Basic literature  | <ol style="list-style-type: none"><li>1. W. Salmonowicz, Łączność w niebezpieczeństwie GMDSS, Wyższa Szkoła Morska w Szczecinie, Szczecin 2001</li><li>2. R. Wawruch, Uniwersalny statkowy system automatycznej identyfikacji (AIS), Akademia Morska w Gdyni, Gdynia 2002</li><li>3. R. Śmierzchalski, "Automatyzacja i sterowanie statkiem", Wydawnictwo Politechniki Gdańskiej, Gdańsk 2013</li></ol>  |  |
|  | Supplementary literature  | <ol style="list-style-type: none"><li>1. A. N. Ince et al., Principles of integrated maritime surveillance systems, Springer Science+Business Media, New York 1998</li><li>2. COLREGS - International Regulations for Preventing Collisions at Sea,(1972), Lloyd's Register Rulefinder 2005 – Version 9.4</li><li>3. SOLAS - International Convention for the Safety of Life at Sea, Lloyd's Register Rulefinder 2005 – Version 9.4</li></ol>  |  |
|  | eResources addresses  | Adresy na platformie eNauczanie:   |  |
| Example issues/<br>example questions/<br>tasks being completed |   |  |  |
| Work placement   | Not applicable  |  |  |