



## Subject card

|   |   |  |   |            |   |         |     |
|---|---|--|---|------------|---|---------|-----|
| Subject name and code                       | , PG_00057123   |  |   |            |   |         |     |
| Field of study                              | Ocean Engineering   |  |   |            |   |         |     |
| Date of commencement of studies             | February 2022   | Academic year of realisation of subject  |   |            | 2021/2022   |         |     |
| Education level                             | second-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                               | 1   | Language of instruction  |   |            | Polish  |         |     |
| Semester of study                           | 1   | ECTS credits   |   |            | 4.0   |         |     |
| Learning profile                            | general academic profile  | Assessment form  |   |            | assessment  |         |     |
| 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. Aleksander Kniat  |            |   |         |     |
|   | Teachers  |  | dr inż. Aleksander Kniat<br>mgr inż. Jacek Frost<br>mgr inż. Wojciech Olszewski |            |   |         |     |
| 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  |  |   |            |   |         |     |
|   | Zastosowanie technologii cyfrowych w okrętownictwie (PG_00057123) - Moodle ID: 23542<br><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23542">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23542</a> |  |   |            |   |         |     |
| 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   | 10.0  |            | 30.0  |         | 100 |
| Subject objectives                          | The aim of the subject is to enhance the skills to create algorithms and computer programs as well as using ready-made software tools to perform numeric calculations and simulations in ocean engineering.                     |  |   |            |   |         |     |
| Learning outcomes                           | Course outcome  | Subject outcome  |   |            | Method of verification  |         |     |
|   | [K7_U04] can apply mathematical methods and models and computer simulations to analyse, design, and assess the functioning of ocean technology objects and systems and their elements   | Student implements algorithms in programming language. Student handles events in window graphics systems.                  |   |            | [SU1] Assessment of task fulfilment<br>[SU2] Assessment of ability to analyse information<br>[SU4] Assessment of ability to use methods and tools |         |     |
|   | K7_W04  | Student knows principles of algorithm creation and uses structural/objective programming language to implement algorithms. |   |            | [SW1] Assessment of factual knowledge   |         |     |
|   | [K7_W02] has a widened knowledge in the range of modelling technological processes, including knowledge necessary to describe and assess the functioning of selected elements of ocean technology objects and systems           | Student is able to describe physical phenomena with differential equation and implements numerical solution method.        |   |            | [SW1] Assessment of factual knowledge<br>[SW3] Assessment of knowledge contained in written work and projects                                     |         |     |

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|--|--|--|-------------------------------|
| Subject contents   | <p>Fundamentals in C# programming:</p> <ul style="list-style-type: none"> <li>• structural and object oriented programming,</li> <li>• algorithms and data,</li> <li>• implementing/executing a program,</li> <li>• command line dialog/controls in Windows Forms,</li> <li>• file system usage</li> </ul> <p>Solving one dimensional physical problems defined with differential equation:</p> <ul style="list-style-type: none"> <li>• damping oscillations of a mass hanged on spring,</li> <li>• damping oscillations of a of cuboid fallen into water</li> </ul> <p>Accessing the functionality of other programs:</p> <ul style="list-style-type: none"> <li>• creating complex operations in Excell,</li> <li>• calculating wetted surface and buoyancy for different draughts of a ship hull in a 3D CAD program.</li> </ul> |  |                               |
| Prerequisites and co-requisites                                | fundamental skills in using personal computer, basic knowledge about operating system and file system, bachelor's course in mathematics  |  |                               |
| Assessment methods and criteria                                | Subject passing criteria   | Passing threshold  | Percentage of the final grade |
|  | exercises completion   | 60.0%  | 100.0%                        |
| Recommended reading  | Basic literature   | <p>Nagel Ch., Professional C# and .Net, 8th edition, Wrox Press, 2021</p> <p>Albahari J., Albahari B., C# 10 Pocket Reference: Instant Help for C# 10 Programmers, O'Reilly UK Ltd., 2022</p> <p>Sharp J., Microsoft Visual C# Step by Step, 9th edition, Microsoft Press US, 2018</p> |                               |
|  | Supplementary literature   | Wirth N., Algorytmy + struktury danych = programy, ISBN: 83-204-2740-1, WNT 2002   |                               |
|  | eResources addresses   |  |                               |
| Example issues/<br>example questions/<br>tasks being completed | <ol style="list-style-type: none"> <li>1. defining variables and performing arithmetic calculations,</li> <li>2. printing in console and retrieving input data from console,</li> <li>3. simple calculation algorithm implementation e.g. system of linear equations,</li> <li>4. creation of vectors/matrices and performing operations on them e.g. search, sort,</li> <li>5. creation of procedures and functions e.g. factorial</li> <li>6. defining class hierarchy and objects,</li> <li>7. window programming (controls)</li> <li>8. graphics context and painting in a window</li> <li>9. simulating motion in a graphic window (timer application) e.g. damped movements</li> <li>10. accessing other programs e.g. geometric calculations in SolidEdge</li> </ol>  |  |                               |
| Work placement   | Not applicable   |  |                               |