GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Application of digital technologies in shipbuilding, PG_00057179
Field of study	Ocean Engineering

Date of commencement of studies	February 2023	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	blended-learning
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 mgr inż. Jacek Frost dr inż. Aleksander Kniat

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	18.0	0.0	18.0	0.0	0.0	36
	E-learning hours included: 18.0						

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	36	10.0	54.0	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_W04	Student knows principles of algorithm creation and uses structural/objective programming language to implement algorithms.	[SW1] Assessment of factual knowledge
	[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.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[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.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents	Fundamentals in C# programming:
	• structural and object oriented programming, • algorithms and data, • implementing/executing a program, • command line dialog/controls in Windows Forms, • file system usage Solving one dimensional physical problems defined with differential equation: • damping oscillations of a mass hanged on spring, • damping oscillations of a of cuboid fallen into water Accessing the functionality of other programs: • creating complex operations in Excell, • calculating wetted surface and buoyancy for different draughts of a ship hull in a 3D CAD program.

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	Nagel Ch., Professional C# and .Net, 8th edition, Wrox Press, 2021 Albahari J., Albahari B., C# 10 Pocket Reference: Instant Help for C# 10 Programmers, O'Reilly UK Ltd., 2022 Sharp J., Microsoft Visual C# Step by Step, 9th edition, Microsoft Press US, 2018
	Supplementary literature	Wirth N., Algorytmy + struktury danych = programy, ISBN: 83-204-2740-1, WNT 2002
	eResources addresses	Adresy na platformie eNauczanie: Zastosowania technologii cyfrowych w okrętownictwie W/L Oceanitechnika st.II Nst, sem.01, letni 2022/2023 - Moodle ID: 29715 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29715

Example issues/ example questions/ tasks being completed	1. defining variables and preforming arithmetic calculations, 2. printing in console and retrieving input data from console, 3. simple calculation algorithm implementation e.g. system of linear equations, 4. creation of vectors/matrices and performing operations on them e.g. search, sort, 5. creation of procedures and functions e.g. factorial 6. defining class hierarchy and objects, 7. window programming (controls) 8. graphics context and painting in a window 9. simulating motion in a graphic window (timer application) e.g. damped movements 10. accessing other programs e.g. geometric calculations in SolidEdge

Work placement	Not applicable