GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00057340		
Field of study	Ocean Engineering		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
Education level	second-cycle studies	Subject group	Optional subject group 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	2	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Ship Manufacturing Technology, Quality Systems and Materials Science -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Karol Niklas	
	Teachers	dr inż. Ryszard Pyszko dr inż. Karol Niklas mgr inż. Dariusz Duda	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	30.0	0.0	75
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	75	15.0	35.0	125

Subject objectives

The aim is to familiarize the students with the systems of exploration, preparation for the operation and exploitation of defaulting deposit on the seabed and under the sea bottom
To familiarize students with current international provisions for the exploitation of marine resources - law of the sea

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W06] has an organized, widened knowledge on engineering methods and design tools allowing the conducting of advanced projects within the construction and operation of ocean technology objects and systems	Student understands needs and takes into account the impact of installation and operation of transport and foundation or anchoring properties, as well as influence of their exploitation on the marine environment Student when developing technology of transport operations and installation of offshore units and processes of their operation uses knowledge from both the range of ocean engineering and mechanical engineering. He is able to perform simple calculations on equipment parts related to operation of ships and other offshore units	[SW1] Assessment of factual knowledge
	[K7_W05] has an organized, widened knowledge on design, construction and operation of ocean technology objects and systems	Student understands the physical phenomena which accompany operations and processes of technical activities related to offshore units and can include them in your design work Student keeps track of the technical development in design of offshore units and their equipment and he is able to apply them in design process and work organization	[SW1] Assessment of factual knowledge
	[K7_U07] in compliance with a formulated specification and with the aid of appropriate tools and methods, is able to complete an advanced engineering task within the range of design, construction and operation of ocean technology objects and systems	Student is able to analyze the new design solutions and technologies and certain operations or operational processes, and then he is able to assess their advantages and disadvantages in order to possibly use in your design work. He is familiarized with contemporary computing systems and can perform analytical calculations and validate their performance	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment

Subject contents	**OFFSHORE WIND FARMS** Prognoses for the development of offshore wind farms Fundamentals of wind energetics Key elements of offshore wind farms Design solutions of turbine load-bearing structures Infrastructure for transmission and conversion of electricity Foundations of wind turbines Regulations for location of offshore wind farms Vessels designed for transport, installation and operation of offshore wind farms **SYSTEMS FOR SEARCHING OIL AND GAS UNDER THE SEABED** Oil and gas formation Techniques used to locate reserves Seismic survey technique Seismic survey vessels (SSV) Seismic streamer and its components Operational performance **SYSTEMS FOR EXTRACTING OIL AND GAS FROM THE SEABED** Structures of offshore oil and gas recovery units Basic offshore rig components **STATIONARY MARINE DRILLING UNITS** Fixed Jacked Platforms Jack-up Platforms Gravity base platforms Compliant towers **STRUCTURES THAT FLOAT NEAR THE WATER SURFACE**

	TLP (Tension Leg Platform) Platforms SPAR (Single Point Anchor Reservoir) Platforms Semi-submersible rigs Drilling ships **DRILLING AND PRODUCTION EQUIPMENT (selected issues)** What is the drilling process? Drilling equipment (drillstring; blowout preventer) What is the production process? (offshore riser systems; drive mechanism of rigs) **OFFSHORE OIL DRILLING PROCESS (selected issues)** Types of offshore oil drilling Vertical (conventional) drilling Directional (slant) drilling Extraction process **PRODUCTION TECHNOLOGY (selected issues)** Essential components of offshore production systems Offshore un-manned platforms Types of subsea installations and equipment **LAYING PIPE ON THE SEAFLOOR (selected issues)** Offshore pipeline Route selection Ways of laying pipe on the seafloor Pipelay process Trenching and burial of offshore pipelines Pipeline welding technology Types of pipelay vessels

	Floating production systems **STATION KEEPING SYSTEMS OF OFFSHORE FLOATING UNITS** Mooring lines and their components (lines of mooring systems; anchors and connectors) Station keeping systems of FPSO (turret systems) Dynamic positioning systems and their elements (position reference systems, propellers)
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
laboratory	51.0%	26.0%
lectures - test	66.0%	49.0%
workout	51.0%	25.0%

Recommended reading

Basic literature	Günther Clauss, Eike Lehmann, Carsten Östergaard. Offshore Structures: Volume I and Volume II. Springer 2012 Huacan Fang and Menglan Duan. Offshore Operation Facilities. Equipment and Procedures. http://www.sciencedirect.com/science/book/9780123969774 Subrata K. Chakrabarti. Handbook of Offshore Engineering. Elsevier 2005. Charlier, R. H., Finkl, Charles W. Ocean Energy. Tide and Tidal Power. Springer. 2009.
Supplementary literature	Tarełko W. Power Take-off Systems of Offshore Rig Power Plants. Journal of Polish CIMAC. Vol. 5 No 1. 2010. pp. 187-198
eResources addresses	

Example issues/ example questions/ tasks being completed	The SPAR platforms can have spiral flanges or strakes: a) to reduce vortex shedding in strong currents b) to increase vortex shedding in strong currents c) to convert vortex shedding in laminar currents d) to convert vortex shedding in turbulent currents
Work placement	Not applicable