Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Environmental Protection**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	1	1	1	

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	45	15	0	0	0	60

Name of lecturer(s)	Roman Liberacki, Zbigniew Górski

Learning outcomes of the course unit

The student lists environmental hazards associated with the operation of ships and other technical objects operating at sea. The student lists the most important conventions for the protection of the marine environment. The student lists the environmental equipment used on ships. The student describes the construction of environmental protection equipment such as oil separator from bilge water, sewage treatment plant, waste incinerator. Student mentions ways of disposing of living organisms in ballast water. A student discusses ways to reduce emissions to the atmosphere. The student selects the devices for the prevention of the marine environment. The student describes the principles of safe bunkering of fuels and oils on board. The student describes the procedures and design ways to prevent oil spillages from tankers and drilling platforms.

Prerequisites and co-requisites

No requirements.

Course contents

Environmental hazards associated with the operation of ships and other technical objects operating at sea. The most important conventions for the protection of the marine environment (MARPOL, HELCOM). Construction, working principles and the methods of selecting the environmental protection equipment used on ships (oil separator from bilge water, sewage treatment plant, waste crambler and waste incinerator). Methods of disposing of living organisms in ballast water and selection of appropriate method for the ship. Principles of safe bunkering operations on the vessels and the technical means to prevent oil spills during these operations. Design solutions and procedures to be followed for safe operation of crude oil tankers and drilling platforms. Seminar: Selected problems of environmental management in the construction and repair of ships and ocean engineering units. The role and scope of interference of Classification Societies in maintaining the technical condition of units under their supervision. Systems inspection and repairs preventive and control. Ways to maintain the quality of hull corrosion protection. Environmental aspects in the rehabilitation and construction of ships and ocean engineering. Legal aspects of ecological docking process. Special Issues implementation of selected processes in the course of repairs. The seminar - drafting and review of the impact of work-related corrosion protection hull of the marine environment - working in teams multiplayer. Each team develops a different portion of the repair issues with particular emphasis on environmental aspects.

Recommended and requiered reading

Basic literature

1) Kaniewski E., Tymański S.: Ochrona środowiska. Gdynia, WSM, 1987. 2) Małaczyński M.: Ochrona środowiska morskiego przed zanieczyszczeniami ze statków. PG, Gdańsk, 1980. 3) Wiewióra A.: Ochrona środowiska morskiego w eksploatacji statków. WSM, Szczecin, 1999 r. 4) International Convention for the Prevention of Pollution from Ships MARPOL 73/78. 5) Konwencja o ochronie środowiska morskiego obszaru Morza Bałtyckiego. 6) PRS: Przepisy klasyfikacji i budowy statków morskich.

7)A. Matuszak-Flejszman- Benefits of Environmental Management System in Polish Companies Compliant with ISO 14001 – Polish J. of Environ. Stud. Vol. 18, No. 3 (2009), 411-419; 8)Environmental management- The ISO 14000 family of International Standards; 9)www.epa.gov/sectors/sectorinfo/sectorprofiles/shipbu.-“ EMS Implementation Guide for the Shipbuilding and Ship Repair Industry and 10) Findings and Recommendations on Lean Production and Environmental Management Systems in the Shipbuilding and Ship Repair Sector.

Supplementary literature

No requirements.

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60%	50%
	Power point presentation	100%	50%

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Marine and Intermodal Transport**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	1	1	5	

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	30	15	-	-	30	75

Name of lecturer(s)	Mirosław Gerigk

Learning outcomes of the course unit

The learning outcomes of the course unit regarding the marine transport is to obtain the knowledge on the definitions, infrastructure, means and systems of the marine and intermodal transport. The first main part of the knowledge given to the students is connected with the infrastructure divided to marine transport infrastructure and intermodal transport infrastructure. The second main part concerns the means of transport concerning mainly the seagoing ships and inland ships including the intermodal means of transport. The third part is associated with the marine transport and intermodal transport systems. The final part of the course concerns the complex problems connected with the marine and intermodal transport.

Prerequisites and co-requisites

A student should have a good level of general knowledge on the marine and intermodal transport including the infrastructure, means and systems. The knowledge on the general issues of transportation, logistics, theory of systems, theory of safety, mathematical modeling, etc. are very important, too.

Course contents

The contents of the course are as follows:
- marine and intermodal transport in development of economy,
- definitions of the marine and intermodal transport,
- system of marine and intermodal transport, system elements and interrelations between the elements,
- infrastructure of the marine transport,
- infrastructure of the intermodal transport,
- means of marine transport (seagoing ships),
- means of intermodal transport (inland ships, railway, road means of transport),
- marine and intermodal transport systems including the management systems and safety assessment systems,
- complex approach to solve the problems concerning the marine and intermodal transport,
- challenges concerning the marine and intermodal transport.

Recommended and requiered reading

Basic literature

1. Rydzkowski W., Wojewódzka-Król. K. Transport. Problemy transportu w rozszerzonej UE. Wydawnictwo naukowe PWN Sp. z o.o., Warszawa 1997, 2000, 2005, 2009.
2. Krystek R. et al. Zintegrowany system bezpieczeństwa transportu. Tom I, II i III, Politechnika Gdańska 2009, Wydawnictwa Komunikacji i Łączności sp. z o.o., Warszawa 2009.

Supplementary literature

1. Jędrzejczak Z. et al. Badania operacyjne w przykładach i zadaniach. Wydawnictwo Naukowe PWN SA, Warszawa 1999, 2002, 2004.
2. Matulewski M. et al. Systemy logistyczne, komponenty, działania, przykłady. Biblioteka Logistyka, Instytut Logistyki i Magazynowania, Poznań 2008.
3. Niziński S. et al. Logistyka dla inżynierów. Wydawnictwa komunikacji i Łączności sp. z o.o., Warszawa 2011.

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Marine Applied Informatics, CAE and Design Tools I**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	1	1	5	MSc

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	30		30			

Name of lecturer(s)	A.Kniat, J. Kapcia, R. Szłapczyński, T. Niksa

Learning outcomes of the course unit

student formulates algorithms to solve simple engineering problems
student understands structural and object oriented programming
student implements algorithms in a programming language
student implements events handling in a window system
student solves equations in Matlab
student defines and solves optimization problems in Matlab

Prerequisites and co-requisites

proficiency in using PC computer, completed course of Mathematics for mechanical engineers

Course contents

PROGRAMMING:
- Programming language syntax,
- Program design phases: algorithm, implementation, debugging,
- Dialog with user : command line, windows interface,
- File system (files & streams): types of files and streams, opening, searching, reading/writing, closing.

MATLAB:
- Solving equation systems,
- Vectors and matrices processing,
- Interpolation and approximation,
- Optimization,
- Graphic results presentation: two and three dimensional graphs,
- Importing and exporting data.

Recommended and requiered reading

Basic literature

Moler C., Numerical Computing with MatLab, Copyright 2004, Cleve Moler
Petzold C., Programming Windows, Microsoft
Wirth N., Algorithms + Data Structures = Programs, Prentice Hall

Supplementary literature

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Material Engineering & Manufacturing Technology**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	1	1	6	

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	30	-	30	-	-	60

Name of lecturer(s)	Dr hab. inż. M. Jakubowski

Learning outcomes of the course unit

The student describes new and technological advanced structural materials designed for shipping and ocean objects. Student names basic kinds of new structural materials It exchanges the for shipbuilding and ocean technology as well as their properties. Student explains basic physical principles during their production and processing. Student describes principle of acceptance of these materials applied in industry. Student describes principle their selection for ship and offshore structures. Student makes the safe and exact measurements as well as opinions of new structural materials dedicated for ocean and ship structures in laboratory.

Prerequisites and co-requisites

Basic knowledge of subject: Materials Science for Naval Architectures & Marine engineers

Course contents

LECTURE

The most essential tasks to achievement by material science and material engineering in the closest decades. Historical development of engineering materials. Prognosis of development of engineering materials. The modern materials for marine technique as well as their development {Structural steels of mass use. Maraging steels . Duplex steels. Copper alloys. Alloys of aluminium and magnesium. Titanium"s and titanium alloys. Cobalt and cobalt alloys. Alloys Cr - Ni - N. Zinc, lead, tin and their alloys. The metals with shape memory. Super plasticity alloys. Hard magnetic materials. Metallic glasses. Electronic materials. Superconductive materials. Carbon materials. Ceramic materials. Super hard materials. Composites. The present methods of materials investigations for marine technology.

LABORATORY

Microstructures investigation of structural ferritic-martensitic and maraging steels. Microstructures investigation of duplex steels. New cast alloys designed for ship propellers. Application of new non-destructive (NDT) methods of investigations in engineering. Investigation of titanium"s and titanium alloys for marine technology. Investigation of new aluminium alloys for marine technology.

Recommended and requiered reading

Basic literature

1. RW. Cahn, P. Haasen, E. J. Kramer: Materials science and technology. Volume 1 - 18. Wiley-Vch, Verlag GmbH & Co, KGaA, Weinheim 2005.

2. ASM Handbook. Volume 1 - 9. Edited by ASM International**.**

3. Ashby M., Shercliff H., Cebon B, Materials engineering, science, processing and design. published by Elsevier Ltd., 2007, 2010

Supplementary literature

Assessment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	100.00%	50.00%
	Midterm colloquium	60.00%	50.00%

Kierunek	Oceanotechnika	Specjalność	Ocean Engineering
Nazwa przedmiotu	**Design and Manufacturing Technology I**		

Kod przedmiotu	Rok studiów	Sem. studiów	Liczba pkt. ECTS	Typ przedmiotu
	I	1	3	MSC

Metody nauczania	Wyk.	Ćw.	Lab.	Pr.	Sem.	Suma
	15	15	15	-	-	45

odpowiedzialny/a	Wojciech Litwin

Efekty kształcenia/uczenia się przedmiotu

Lecture and practice:
Student know and describe base manufacture technology's like forging, casting and machining.
Student know, describe, calculate and is able to draw a rivet, different kinds of welding and screw coupling.
Student is able to conduct a calculations of shafts and axles coupling.
Student know, describe, calculate and is able to draw a different types of journal connections with hub.
Student know, describe and is able to choose from catalogue different types of clutches.
Student know, describe, calculate and is able to draw different kinds of sliding and ball bearings. Student understand differences between them and know main advantages and disadvantages.
Student know, describe different types of gears. Student is able to prepare a drawings and conduct calculations.
Student know how to use gears catalogue and choose proper type.
Student recognize axial and planetary gears and is able to prepare drawings, know the limitations and advantages and disadvantages.
Student know belt and chain drives. Student is able to conduct some calculations and prepare sketches.
Student know ship shafting constructions and describe propulsion main parts like propeller, shafts, bearings, clutches, sealings etc.

Laboratory:
Student recognize and describe main types of machine tools. Student is able to mount and dismount simple machines.

Design:
Student is able to design machine like gear etc. and conduct necessary calculations. Student is able to use CAx systems in practice.

Wymagania wstępne i dodatkowe	On first semester – design in 3D CAX (NX Siemens software – licence available on Faculty)

Treści przedmiotu

1. Lecture and practice:
1.1. Forging, casing and machining in machine design.
1.2. Coupling. Riveting, welding, screws. Shaft coupling.
1.3. Sliding bearings. Types, calculations.
1.4. Roller bearings. Types, calculations.
1.5. Gears. Types, calculations.
1.6. Planetary and axial gears.
1.7. Belt and chain gears.
1.8. Ship shafting. Shafts, bearings, sealings.
2. Laboratory:
2.1. Machining (turning, milling, drilling, szlifierka).
2.2. Coupling (glue, welding, screw, riveting) – sample preparations by students.
2.3. Coupling strength tests.
2.4.÷2.8. Dismounting and mounting of machines 1 ÷ 5
3. Design:
During a semester students conduct one bigger or two smaller design exercises.

Zalecana lista lektur

Literatura podstawowa

Merhyle F. Spotts, Terry E. Shoup, Lee E. Hornberger, Design of Machine Elements; Prentice Hall; 8 edition (October 24, 2003)
Robert L. Norton: Machine Design; ce Hall; 5th edition (2013)
Jack A. Collins, Henry R. Busby, George H. Staab: Mechanical Design of Machine Elements and Machines; Wiley; 2 edition (October 19, 2009)

Literatura uzupełniająca

Metody i kryteria oceniania	Kryteria oceniania składowe	Próg zaliczeniowy	Procent składowej oceny końcowej

Kierunek	Oceanotechnika	Specjalność	Ocean Engineering
Nazwa przedmiotu	**Marine Renewable Energies I**		

Kod przedmiotu	Rok studiów	Sem. studiów	Liczba pkt. ECTS	Typ przedmiotu
	1	1	3	MSc

Metody nauczania	Wyk.	Ćw.	Lab.	Pr.	Sem.	Suma
	30	-	15	-	-	45

odpowiedzialny/a	Prof. dr hab. inż. C. Dymarski

Efekty kształcenia/uczenia się przedmiotu

Student wymienia postacie energii odnawialnej występujące w środowisku morskim, możliwe do komercyjnego pozyskiwania.
Opisuje charakterystyczne cechy każdej z wymienionych postaci energii pod względem możliwości jej pozyskiwania.
Wymienia stosowane dotychczas metody pozyskiwania wymienionych postaci energii.
Potrafi rozróżnić i opisać te metody w zależności od sposobu pozyskiwania i rozwiązania konstrukcyjnego systemu
Potrafi dokonać ogólnej oceny możliwości i efektywności stosowanych dotychczas metod pozyskiwania energii
Potrafi także dostrzec i ocenić przewidywany wpływ poszczególnej metody na środowisko naturalne

Wymagania wstępne i dodatkowe

Mechanics
Fundamentals of Electrotechnics

Treści przedmiotu

Forms of energy in the marine environment possible for commercial acquisition .
Energy of currents, tides , wave and also differences of water temperature and salinity.
Wind energy. Solar energy
Methods of obtaining these types of energy: types of turbines or other engines, used gears and other equipment for processing and transmission of energy; types of generators and methods of regulation and security .
Tidal and current power plants with turbines in ducts or loose .
Wave power - coastal sited and offshore, floating, surface, underwater, with turbine and reciprocating or rotary piston motors and with linear, rotating or oscillating generators.
Marine wind turbines mounted on supporting structures erected and floating with different types turbines, generators , and control methods .
The principle of operation of power plants using temperature or salinity differences of the water.
Comparison of the effectiveness and the various characteristics listed power plant with respect to their impact on the environment.

Zalecana lista lektur

Literatura podstawowa

1. Krzyżanowski W.: Turbiny wodne. Konstrukcja i zasady regulacji. WNT Warszawa 1971
2. Wolańczyk F.: Elektrownie wiatrowe. Wydawnictwo KaBe. Krosno 2009
3. Bernhoff H., Sjosttedt E., Leijon M.: Wave energy resources in shelterd sea areas: A case study of the Baltic Sea. The Fifth European Wave Energy Conference, 17-20 September 2003, In Cork, Ireland
4. Przepisy towarzystw klasyfikacyjnych, w tym PRS i DNV

Literatura uzupełniająca

1. http://www.renewableenergyworld.com/rea/home
2. "Analysis of Wind Energy in the EU-25" (PDF). European Wind Energy Association. Retrieved 2007-03-11.
3. *Tidal power* (PDF), retrieved 2010-03-20

Metody i kryteria oceniania	Kryteria oceniania składowe	Próg zaliczeniowy	Procent składowej oceny końcowej

Subject name	Power Transmission Systems		
Subject code	O:096080		
Faculty	Department of Marine Mechatronics		
Course name	Ocean Engineering		
Learning area			
Learning profile		Study year	1
Type of subject	Obligatory	Study semester	1
Study level	Full-time studies postgraduate studies	ECTS	5

ECTS details

Activity	gk	pw
Lecture	30	
Excerciese	30	
Laboratories	15	
Consulation	10	
Lecture studies		40
Sum	85	40
Parameter ECTS	25	25
ECTS components	3,4	1,6
ECTS sum	5	

Name of lecturer

prof. dr hab. inż. Czesław Dymarski
mgr inż. Tomasz Pająk
mgr inż. Jędrzej Żywicki
prof. dr hab. inż. Czesław Dymarski

Subject objectives

Learning outcomes

Course outcome	Subject outcome	Method of veryfication
K_U01		
K_U09		
K_U11		
K_U12		
K_W04		
K_W13		
K_W14		

Mode of delivery

at the university

Prerequisites

Recommended components

Subject contents

Recommended and required reading

Required reading
Recommended reading

Planned learning activities

Lecture	Exercise	Laboratory	Project	Seminar	Sum
30	30	15	0	0	75

W tym nauczanie na odległość: 0.0

Assesment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	0.0	0.0

Example issues / example questions / tasks completed

Language of instructions

Polish

Work placement

Not applicable

Subject name	Finance and Economy in Engineering Design		
Subject code	O:096100		
Faculty	Department of Energy and Industrial Apparatus		
Course name	Ocean Engineering		
Learning area	technical sciences		
Learning profile	general academic profile	Study year	1
Type of subject	Obligatory	Study semester	2
Study level	Full-time studies postgraduate studies	ECTS	3

ECTS details

Activity	gk	pw
Lecture	15	
Excerciese	30	
Consulation	2	
Lecture studies		6
Excerciese preparation		6
Test preparation		8
Final test preparation		8
Sum	47	28
Parameter ECTS	25	25
ECTS components	1,88	1,12
ECTS sum	3	

Name of lecturer	dr inż. Aleksandra Wiśniewska dr inż. Aleksandra Wiśniewska
Subject objectives	The aim of the course is to acquaint students with modern methods of project management, supervision of them for the use of practical tools for project management and the achievement of the business objectives of the project. The issues of strategic project management, financial aspects of project management, organization and planning of the project, methods of team management and communication in project management are discussed during the course. The course should prepare students for effective participation in the team projects.

Learning outcomes	Course outcome	Subject outcome	Method of veryfication
	K_K08	The student correctly identifies and resolves dilemmas related to the profession of engineer assesses the risks and able to assess the effects of the activity in the field of engineering profession. The student has an awareness of his own limitations and knows when to ask the experts	[SW1] Assessment of factual knowledge [SU2] Assessment of ability to analyze information [SK4] Assessment of communication skills
	K_K12	The student has a sense of the weight of social attitudes and personal qualities: teamwork, fair play, applying the principles of fair play, conscientiousness in work, responsibility, strength of purpose.	[SK1] Assessment of group work skills [SK4] Assessment of communication skills [SU1] Assessment of task fulfilment [SK3] Assessment of ability to organize work
	K_U11	The student can assess the suitability of methods and tools for solving engineering tasks involving the construction and operation of facilities and equipment of ocean, and recognize their limitations and choose and apply the right method and tools to solve complex design tasks associated with the economic analysis and financial control of the project.	[SW1] Assessment of factual knowledge [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained in the different modules [SK5] Assessment of ability to resolve work-related problems
	K_W10	The student has knowledge of the prospects for the development of facilities and equipment of ocean, and understand the new, the most important achievements in the field of Ocean. The student has extensive knowledge in the natural sciences possible an assessment of the design objects interact with their surroundings.	[SW1] Assessment of factual knowledge [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained in the different modules [SK5] Assessment of ability to resolve work-related problems [SU2] Assessment of ability to analyze information
	K_W12	The student has the mathematical knowledge relating to the description and analysis of the operation of machinery and equipment, as well as the associated technical processes, mastering the basics of diagnostics of technical equipment and security systems.	[SW1] Assessment of factual knowledge [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained in the different modules
Mode of delivery	at the university		
Prerequisites			
Recommended components			

Subject contents	1. Engineering Economic: Establishing Economic Equivalence, Interest: The cost of money, the elements of transactions, involving interest, equivalence calculations, interest formulas, nominal and effective interest rates, loss of purchasing power. 2. Measures of Project Worth: describing project cash flows, present worth analysis, annual equivalent method, rate of return analysis, accept/reject decision rules, mutually exclusive alternatives. 3. Cash and Flow Projections: operating profit - net income, tax treatment, effects of inflation. 4. Sensitivity and Risk Analysis: project risk, risk analysis, expected value and variance, decision rule. 5. Design Economics: capital costs vs. operating costs, minimum-cost function 6. Project management: Engineers, projects, management, planning and scheduling, staffing and organizing, team building, project control, estimation and contracting. Exercises: 1. Team building: types of personality, effectiveness of the team. 2. Project Management: WBS, Gantt, Earned Value Method, Critical Path Method, risk management.
Recommended and required reading	**Required reading** • Peterson, S. J. "*Construction Accounting and Financial Management*", Prentice Hall, New York, 2004. • Palmer, W., Palmer, W. J., Coombs, W. E. and Smith, K. A., "*Construction Accounting and Financial Management*", McGraw Hill, New York, 1999. • Pilcher, R., "*Principles of Construction Management*", McGraw-Hill, 1992. • Gibson, C. H., "*Financial Statement Analysis*" International Thomson Publishing, 1998. • Brigham, E. F., Gapenski, L. C. and Erhardt, M. C., "Fin*ancial Management: Theory and Practice*", The Dryden Press, 1999. • PMBOK **Recommended reading** • Dell'Isola, A. "*Value Engineering: Practical Applications for Design, Construction, Maintenance and Operations* ", MRS. Means Company Ltd, 1997. • Kelly, J., Male, S. and Graham, D. "*Value Management of Construction Projects*" Blackwell Sciences, 2004. • Parker, D. E., "*Management Application of Value Engineering: For Business and Government*", The Value Foundation, Washington D.C., 1994. • Kumar, S., "*Value Engineering: A Fast Track to Profit Improvement and Business Excellence*", Narosa Publishing House, 2004. • Barrie, D. S. and Paulson, B. C., "*Professional Construction Management*", McGraw-Hill, 1992.

Planned learning activities

Lecture	Exercise	Laboratory	Project	Seminar	Sum
15	30	0	0	0	45

W tym nauczanie na odległość: 0.0

Assesment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final test	49.0	100.0
	Example issues / example questions / tasks completed 1. Team Building: Types of Personalities (2x2h), 2. Effectivness of the Team (2x2h). 3. Project Management: WBS (2x2h), 4. Gantt (1x2h), 5. Earned Value Method (2x2h), 6. Project's Nets 1&2 Method (Critical Path Method) (3x2), 7. Risk Management (2x2h). 8. Test (1x2h)		
Language of instructions	English		
Work placement	Not applicable		

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Modelling and Simulation in Ocean Engineering**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	1	2	4	obligatory

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	30	-	30	-	-	60

Name of lecturer(s)	

Learning outcomes of the course unit	student is able to explain mathematcal modelling role, student is able to formulate mathematical modelling principles, student is able to apply mathematical modelling methods,
Prerequisites and co-requisites	Knowledge of mathematics fundamentals
Course contents	Mathematical Modelling Principles, Inverse Problem in Physics, Model Classification, Linearization, Empirical Modelling, Mathematical Model Equivalence, Parameter Estimation, Model Validation, Distributed Parameter Modelling, Random Process Modelling, Mathematical Model Sensitivity
Recommended and requiered reading	**Basic literature** **1. Babatunde A. Ogunnaike, W. Harmon Ray: Process Dynamics, Modelling, and Control, Oxford University Press , Oxford, New York, 1994, 2. Cooper G.R., Mc Gillem C.D.: Probabilistic Methods of Signal and Systems Analysis, Oxford University Press, Oxford, New York, 1999, 3. Jordan D.W., Smith P.: Mathematical Techniques, Oxford University Press, Oxford, New York, 1998, 4. Lathi B.P.: Signal Processing and Linear Systems, Berkeley Cambridge Press, 1998** **Supplementary literature** 1. Paulo S R. Diniz, Eduardo A.B. da Silva, Sergio L. Netto: Digital Signal Processing, System Analysis and Design, Cambridge University Press, 2002

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloqia	50%	50%
	test	50%	50%

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Reliability, Safety and Risk Analysis I**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	1	2	3	MSc

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	30	15	-	-	-	45

Name of lecturer(s)	Roman Liberacki

Learning outcomes of the course unit	The student defines the terms of reliability, safety and risk. The student identifies and explains the reasons for the application of basic mathematical models in reliability studies. The students calculate the reliability indexes of simple and complex structures. Student discusses the criteria for acceptable risk level. The student uses the method of assessing the probabilities of human errors. The student uses the methods prescribed in the FSA and QRA. Student discusses the procedures and technical means taken to ensure safety during the ships and their systems operation. Student presents ways to reduce the negative effects of the accidents at sea.
Prerequisites and co-requisites	No requirements
Course contents	The main terms of reliability and safety. Reliability of simple and complex objects. Physical aspects of reliability. Empirical indexes of reliability. Basic mathematical models for testing the reliability and safety of complex systems.. Risk and reliability analysis of technical systems. The terms of safety and risk. Risk as a measure of safety. The criteria for acceptable risk. The human factor and the risk. Methods of assessing human error probabilities. Formal safety assessment (FSA). Quantitative safety analysis (QRA). Procedures and technical means taken to ensure security during the operation of ships and their systems. Ways to reduce the negative effects of the accidents at sea.
Recommended and requiered reading	**Basic literature** 1. Brandowski A.: Nauka o bezpieczeństwie. Polit. Warszawska 1993. 2. Melnick E.: Encyclopedia of Quantitative Risk Analysis and Assessment. Viley & Sons. 2008. 3. Modarres M.: What Every Engineer Should Know about Reliability and Risk Analysis. New York, 1993. 4. Swain A.D., Guttman H.E.: Handbook of Human Reliability Analysis with Emphasis on Nuclear Power Plant Applications. Final Report, prepared for U.S. Nuclear Regulatory Commision. August, 1983. 5. IMO (MSC 66/INF.8): A methodology for formal safety assessment of shipping. 1996. **Supplementary literature** No reqiurements

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60%	50%
	Reports	100%	50%

Kierunek	Oceanotechnika	Specjalność	Ocean Engineering
Nazwa przedmiotu	**Design and Manufacturing Technology II**		

Kod przedmiotu	Rok studiów	Sem. studiów	Liczba pkt. ECTS	Typ przedmiotu
	I	2	3	MSC

Metody nauczania	Wyk.	Ćw.	Lab.	Pr.	Sem.	Suma
	-	-	-	45	-	45

odpowiedzialny/a	Wojciech Litwin

Efekty kształcenia/uczenia się przedmiotu

Lecture and practice:
Student know and describe base manufacture technology's like forging, casting and machining.
Student know, describe, calculate and is able to draw a rivet, different kinds of welding and screw coupling.
Student is able to conduct a calculations of shafts and axles coupling.
Student know, describe, calculate and is able to draw a different types of journal connections with hub.
Student know, describe and is able to choose from catalogue different types of clutches.
Student know, describe, calculate and is able to draw different kinds of sliding and ball bearings. Student understand differences between them and know main advantages and disadvantages.
Student know, describe different types of gears. Student is able to prepare a drawings and conduct calculations.
Student know how to use gears catalogue and choose proper type.
Student recognize axial and planetary gears and is able to prepare drawings, know the limitations and advantages and disadvantages.
Student know belt and chain drives. Student is able to conduct some calculations and prepare sketches.
Student know ship shafting constructions and describe propulsion main parts like propeller, shafts, bearings, clutches, sealings etc.

Laboratory:
Student recognize and describe main types of machine tools. Student is able to mount and dismount simple machines.

Design:
Student is able to design machine like gear etc. and conduct necessary calculations. Student is able to use CAx systems in practice.

Wymagania wstępne i dodatkowe	On first semester – design in 3D CAX (NX Siemens software – licence available on Faculty)

Treści przedmiotu

1. Lecture and practice:
1.1. Forging, casing and machining in machine design.
1.2. Coupling. Riveting, welding, screws. Shaft coupling.
1.3. Sliding bearings. Types, calculations.
1.4. Roller bearings. Types, calculations.
1.5. Gears. Types, calculations.
1.6. Planetary and axial gears.
1.7. Belt and chain gears.
1.8. Ship shafting. Shafts, bearings, sealings.
2. Laboratory:
2.1. Machining (turning, milling, drilling, szlifierka).
2.2. Coupling (glue, welding, screw, riveting) – sample preparations by students.
2.3. Coupling strength tests.
2.4.÷2.8. Dismounting and mounting of machines 1 ÷ 5
3. Design:
During a semester students conduct one bigger or two smaller design exercises.

Zalecana lista lektur

Literatura podstawowa

Merhyle F. Spotts, Terry E. Shoup, Lee E. Hornberger, Design of Machine Elements; Prentice Hall; 8 edition (October 24, 2003)
Robert L. Norton: Machine Design; ce Hall; 5th edition (2013)
Jack A. Collins, Henry R. Busby, George H. Staab: Mechanical Design of Machine Elements and Machines; Wiley; 2 edition (October 19, 2009)

Literatura uzupełniająca

Metody i kryteria oceniania	Kryteria oceniania składowe	Próg zaliczeniowy	Procent składowej oceny końcowej

Kierunek	Oceanotechnika	Specjalność	Ocean Engineering
Nazwa przedmiotu	**Marine and Offshore Systems and Equipments I**		

Kod przedmiotu	Rok studiów	Sem. studiów	Liczba pkt. ECTS	Typ przedmiotu
	1	2	3	MSc

Metody nauczania	Wyk.	Ćw.	Lab.	Pr.	Sem.	Suma
	30	-	15	-	-	45

odpowiedzialny/a	Prof. dr hab. inż. C. Dymarski

Efekty kształcenia/uczenia się przedmiotu

Student wymienia podstawowe systemy i urządzenia okrętów i obiektów oceanotechnicznych.
Student opisuje funkcje i zasadę działania i rozmieszczenie tych systemów na statku lub określonym obiekcie.
Potrafi rozróżnić odmiany konstrukcyjnych rozwiązań poszczególnych systemów i wymienić istotne cechy każdego z nich.
Student potrafi dobrać rodzaj podstawowych systemów i niezbędne wyposażenie dla określonego typu statku lub innego obiektu oceanotechnicznego (offschore).
Potrafi także wyznaczyć podstawowe parametry techniczne dobranego systemu lub urządzenia.

Wymagania wstępne i dodatkowe

Mechanika
Podstawy konstrukcji maszyn

Treści przedmiotu

The functions, principles of operation and the determination of essential equipment and systems of ships and ocean engineering objects including:
1 Mooring and anchor, with the tendons chain, rope, wire rope – chain; tension, semi tension and catenary systems.
2 Steering systems with various types of rudders and steering gear; bow thrusters and azimuth thrusters
3 Handling with different design solutions and propulsion and control systems of these devices
4 Emergency and rescue
5 Ramp, cargo port, watertight doors, hatches.
6 Fire, ballast, bilge and other systems etc.
7 Specialized and technological equipment, including: drilling, mining and other
8 Dynamic Positioning Systems

Zalecana lista lektur

Literatura podstawowa

1. Subrata K. Chakrabarti: Handbook of Offshore Engineering. New York 2005
2. Young Bai, Qiang Bai; Subsea Engineering. Hamdbook. Elsevier New York 2012
3. Przepisy towarzystw klasyfikacyjnych, w tym PRS i DNV

Literatura uzupełniająca

1. Cudny K.: Linie wałów okrętowych. Konstrukcja i obliczenia. Wydawnictwo Morskie, Gdansk, 1990.
2. Perepeczko A.: Okrętowe urządzenia sterowe.
3. Pawlicki K.: Elementy dźwignic. PWN, Warszawa, 1982
4. Stryczek S.: Napęd hydrostatyczny. Elementy i układy. WNT Warszawa
5. SzelangiewiczT.: Podstawy teorii projektowania kotwicznych systemów Utrzymywania pozycji jednostek pływających. Okrętownictwo i Żegluga, Gdańsk 2003

Metody i kryteria oceniania	Kryteria oceniania składowe	Próg zaliczeniowy	Procent składowej oceny końcowej

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Marine Applied Informatics, CAE and Design Tools II**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	2	3	5	MSc

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	15	-	45	-	-	60

Name of lecturer(s)	C. Żrodowski, K. Niklas, P. Dymarski, P. Flaszyński

Learning outcomes of the course unit

Student builds geometric models of real objects for numerical analysis
Student exports different forms of discretized models to a FEA program
Student understands and applies boundary conditions and loads to the model
Student performs FEM calculations
Student visualize and assesses results of FEM calculations

Prerequisites and co-requisites

???

Course contents

Exercising novel strength analysis, fatigue and CFD software students will gain practice in:

- creative design concepts
- calculations results assessment
- optimization
- prototyping
- parametric design of series of products
- manufacturing and life-cycle analysis
- realistic visualizations

Recommended and requiered reading

Basic literaturę

electronic and on-line manuals for NX, Creo-Parametric, Finemarine, ANSYS, Fluent, NASTRAN

Supplementary literaturę

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade

Kierunek	Oceanotechnika	Specjalność	Ocean Engineering
Nazwa przedmiotu	**Marine Renewable Energies II**		

Kod przedmiotu	Rok studiów	Sem. studiów	Liczba pkt. ECTS	Typ przedmiotu
	1	2	5	MSc

Metody nauczania	Wyk.	Ćw.	Lab.	Pr.	Sem.	Suma
	15	-	-	45	-	45

odpowiedzialny/a	Prof. dr hab. inż. C. Dymarski

Efekty kształcenia/uczenia się przedmiotu

Student wymienia postacie energii odnawialnej występujące w środowisku morskim, możliwe do komercyjnego pozyskiwania.
Opisuje charakterystyczne cechy każdej z wymienionych postaci energii pod względem możliwości jej pozyskiwania.
Wymienia stosowane dotychczas metody pozyskiwania wymienionych postaci energii.
Potrafi rozróżnić i opisać te metody w zależności od sposobu pozyskiwania i rozwiązania konstrukcyjnego systemu
Potrafi dokonać ogólnej oceny możliwości i efektywności stosowanych dotychczas metod pozyskiwania energii
Potrafi także dostrzec i ocenić przewidywany wpływ poszczególnej metody na środowisko naturalne

Wymagania wstępne i dodatkowe

Mechanics
Fundamentals of Electrotechnics

Treści przedmiotu

Forms of energy in the marine environment possible for commercial acquisition .
Energy of currents, tides , wave and also differences of water temperature and salinity.
Wind energy. Solar energy
Methods of obtaining these types of energy: types of turbines or other engines, used gears and other equipment for processing and transmission of energy; types of generators and methods of regulation and security .
Tidal and current power plants with turbines in ducts or loose .
Wave power - coastal sited and offshore, floating, surface, underwater, with turbine and reciprocating or rotary piston motors and with linear, rotating or oscillating generators.
Marine wind turbines mounted on supporting structures erected and floating with different types turbines, generators , and control methods .
The principle of operation of power plants using temperature or salinity differences of the water.
Comparison of the effectiveness and the various characteristics listed power plant with respect to their impact on the environment.

Zalecana lista lektur

Literatura podstawowa

1. Krzyżanowski W.: Turbiny wodne. Konstrukcja i zasady regulacji. WNT Warszawa 1971
2. Wolańczyk F.: Elektrownie wiatrowe. Wydawnictwo KaBe. Krosno 2009
3. Bernhoff H., Sjosttedt E., Leijon M.: Wave energy resources in shelterd sea areas: A case study of the Baltic Sea. The Fifth European Wave Energy Conference, 17-20 September 2003, In Cork, Ireland
4. Przepisy towarzystw klasyfikacyjnych, w tym PRS i DNV

Literatura uzupełniająca

1. http://www.renewableenergyworld.com/rea/home
2. "Analysis of Wind Energy in the EU-25" (PDF). European Wind Energy Association. Retrieved 2007-03-11.
3. *Tidal power* (PDF), retrieved 2010-03-20

Metody i kryteria oceniania	Kryteria oceniania składowe	Próg zaliczeniowy	Procent składowej oceny końcowej

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Ship and Offshore Power Systems Design I**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	1	2	4	MSc

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	30	-	15	-	-	45

Name of lecturer(s)	Roman Liberacki, Damian Bocheński

Learning outcomes of the course unit	The student uses available computer programs used in the designing of the ship power plants and energy supply systems on platforms . The student sets the configuration of the propulsion system, electricity generating plant and selects steam boilers. The student designs auxiliary systems: cooling water system, lubricating oil system, liquid and gas fuel system , starting air system, steam heating system. The student designs general ship systems: ballast water system, bilge water system, fire fighting system, hydrophore and sanitary water system. The student designes electricity and heat supply systems, auxiliary systems, safety systems and living systems for offshore drilling plants.
Prerequisites and co-requisites	Knowledge of subjects: Environmental Protection, Propulsion and Power Transmision systems.
Course contents	The use of computer programs used in the designing of ship power plants and energy supply systems on platforms. Determining the configuration of the propulsion system. Determination the configuration of electricity generating plant. Selection of boilers. Designing of auxiliary systems: cooling water system, lubricating oil system, liquid and gas fuel system, starting air system, exhaust gas system, steam heating system. Designing of general ship systems: ballast water system, bilge water system, fire fighting system, hydrophore and sanitary water system. Designing of electricity and heat supply systems, auxiliary systems, safety systems and living systems for offshore drilling plants.
Recommended and requiered reading	**Basic literature** 1. Jamroż J., Wieszczeczyński T.,Swolkień T.:Projektowanie siłowni okrętowych. PG, Gdańsk, 1997. 2. Michalski R.:Siłownie okrętowe. PSz, Szczecin, 1987. 3. Wojnowski W.:Okrętowe siłownie spalinowe. Część III.Gdańsk, 1992. 4. PRS: Przepisy klasyfikacji i budowy statków morskich. Witryny internetowe: www.manbw.com; www.wartsila.com; www.alfalaval.com; www.imo.org **Supplementary literature** No reqiurements.

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60%	100% (2nd semester)
	Project	100%	100% (3rd semester)

Subject name	Project Management		
Subject code	O:096160		
Faculty	Department of Ship Manufacturing Technology, Quality Systems and Materials Science		
Course name	Ocean Engineering		
Learning area	technical sciences		
Learning profile	general academic profile	Study year	2
Type of subject	Obligatory	Study semester	3
Study level	Full-time studies postgraduate studies	ECTS	5

ECTS details

Activity	gk	pw
Lecture	30	
Project	45	
Consulation	5	
Lecture studies		25
Homework creation		20
Sum	80	45
Parameter ECTS	25	25
ECTS components	3,2	1,8
ECTS sum	5	

Name of lecturer	mgr inż. Zbigniew Górski
Subject objectives	Project Management- scope of the project and its organizational structure. Presentation of the methodology of project management with its practical application

Learning outcomes

Course outcome	Subject outcome	Method of veryfication
K_K01	Student is able to think and act in a creative manner, has the ability to learn himself	[SK5] Assessment of ability to resolve work-related problems
K_U01	A student at the end of the course will: • Understand project management related dictionary and specific expressions • Know the tools and methods characteristic for each phase of a project life cycle • Understand the concept of project management knowledge areas • Master the project scope management selected topics • Know the project time management selected topics • Know the project cost management selected topics • Know the project quality management selected topics • Know the project human resources management selected topics • Know the project communication management selected topics • Know the project procurement management related topics • Know the project stakeholder management related topics • Understand the strategic dimension of project management	[SU3] Assessment of ability to use knowledge gained in the different modules
K_W07	Student is able to distinguish project stages, project organisation structure. Student plans methods of project realisation and prepares specification of documentation needed for project. Project schedule is worked out by student as well as risk project evaluation. Student is able to use rules of project management.	[SK2] Assessment of progress of work

Mode of delivery	at the university
Prerequisites	
Recommended components	

Subject contents

Definition of PROJECT. Rules of project management Project budget, cost control and response for critical situation. .Project planning and documentation. Management of risk project .Project management process. Project stages:•Initiation,• Planning,• Realizations,• Monitoring and project controlling,• Validation,• Project completion –closing validation .Resume of good project management practice

Project: Planning process of project. Individual preparation of project card, project schedule, project costs. Estimation of project risk. Preparation of project specification. Report of chosen project connected with project mile stone. Closing report.

Recommended and required reading	**Required reading** A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Fifth Edition • The Scrum Guide™, The Definitive Guide to Scrum: The Rules of the Game, July 2013 • Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Harold R. Kerzner, 11th Edition • Linking Project Management to Business Strategy Hardcover, Aaron J Shenhar – October 1, 2007 • PMP Exam Prep, Eighth Edition - Updated: Rita's Course in a Book for Passing the PMP Exam Eighth Edition **Recommended reading** Literature in the Polish language: 1. Michał Trocki, Bartosz Grucza, Krzysztof Ogonek, Zarządzanie Projektami 2. Trevor L.Young „Skuteczne zarządzanie projektami"; 3. Marek Pawlak „Zarządzanie projektami"; 4. Patrick Lencioni „Pięć dysfunkcji pracy zespołowej'; 5. Scott Berkun „Sztuka zarządzania projektami'

Planned learning activities	Lecture	Exercise	Laboratory	Project	Seminar	Sum
	30	0	0	45	0	75

W tym nauczanie na odległość: 0.0

Assesment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60.0	50.0
	Project	80.0	50.0

Example issues / example questions / tasks completed

Language of instructions	English
Work placement	Not applicable

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Availability and Maintenance of Marine Power and Energy Systems**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	2	3	4	MSc

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	15	15	15	-	-	4

Name of lecturer(s)	Jacek Rudnicki

Learning outcomes of the course unit

Prerequisites and co-requisites

Course contents

1. The basic functional structures of marine power and energy systems.
2. Effective Maintenance, the types of maintenance strategies.
3. Potential failures, causes of failure, consequences of failure and risk in marine power and energy systems.
4. Technical diagnostics as a tool to ensure availability of systems.
5. Lube oil analysis as an instrument for condition monitoring technique - oil sampling principles, fluid property analysis, pro-active maintenance and contamination control, machine wear and analysing wear modes: the problems of contamination and inadequate maintenance: gearboxes, hydraulic systems, bearings, diesel engines
6. Stability evaluation of the marine propulsion unit's mechanical system by means of vibration measurements and their analysis - basics of vibration, data collection, data analysis, vibration signature analysis to diagnose: mass unbalance, bent shafts, misalignment, analysis of rolling element bearings, analysis of gears and gear drives etc.
7. Use of thermography for predictive maintenance.
8. Endoscopic examinations of marine engines.

Recommended and requiered reading

Basic literature

1. D.A. Taylor "Introduction to Marine Engineering", Elsevier Butterworth-Heinemann, 2003.
2. H.D. McGeorge "Marine Auxiliary Machinery", Butterworth-Heinemann, 2000.
3. V. Wowk "Machinery Vibration: Measurement and Analysis", McGraw-Hill Professional 1991.
4. R.W. Ruddock "Basic Infrared Thermography Principles", Reliabilityweb.com Press 2010.
5. H. Kaplan "Practical Applications of Infrared Thermal Sensing and Imaging Equipment', SPIE Publications 2007.
6. M.J. Moran "Availability Analysis: A Guide to Efficient Energy Use", Amer Society of Mechanical 1990.

Supplementary literature

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade

Subject name	Engineering Design - group project		
Subject code	O:096190		
Faculty			
Course name	Ocean Engineering		
Learning area			
Learning profile		Study year	2
Type of subject	Obligatory	Study semester	3
Study level	Full-time studies postgraduate studies	ECTS	2

ECTS details

Activity	gk	pw
Project	30	
Consulation	5	
Lecture studies		15
Sum	35	15
Parameter ECTS	25	25
ECTS components	1,4	0,6
ECTS sum	2	

Name of lecturer

Subject objectives

Learning outcomes

Course outcome	Subject outcome	Method of veryfication
K_K01		
K_K03		
K_K04		
K_K05		
K_K06		
K_K09		
K_U11		
K_U12		
K_U13		
K_U14		
K_U15		
K_W06		

Mode of delivery: at the university

Prerequisites

Recommended components

Subject contents

Recommended and required reading

Required reading
Recommended reading

Planned learning activities

Lecture	Exercise	Laboratory	Project	Seminar	Sum
0	0	0	30	0	30

W tym nauczanie na odległość: 0.0

Assesment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	0.0	0.0

Example issues / example questions / tasks completed

Language of instructions: Polish

Work placement: Not applicable

Kierunek	Oceanotechnika	Specjalność	Ocean Engineering
Nazwa przedmiotu	**Marine and Offshore Systems and Equipments II**		

Kod przedmiotu	Rok studiów	Sem. studiów	Liczba pkt. ECTS	Typ przedmiotu
	2	3	5	MSc

Metody nauczania	Wyk.	Ćw.	Lab.	Pr.	Sem.	Suma
	15	-	-	60	-	75

odpowiedzialny/a	Prof. dr hab. inż. C. Dymarski

Efekty kształcenia/uczenia się przedmiotu

Student wymienia podstawowe systemy i urządzenia okrętów i obiektów oceanotechnicznych.
Student opisuje funkcje i zasadę działania i rozmieszczenie tych systemów na statku lub określonym obiekcie.
Potrafi rozróżnić odmiany konstrukcyjnych rozwiązań poszczególnych systemów i wymienić istotne cechy każdego z nich.
Student potrafi dobrać rodzaj podstawowych systemów i niezbędne wyposażenie dla określonego typu statku lub innego obiektu oceanotechnicznego (offschore).
Potrafi także wyznaczyć podstawowe parametry techniczne dobranego systemu lub urządzenia.

Wymagania wstępne i dodatkowe

Mechanika
Podstawy konstrukcji maszyn

Treści przedmiotu

The functions, principles of operation and the determination of essential equipment and systems of ships and ocean engineering objects including:
1 Mooring and anchor, with the tendons chain, rope, wire rope – chain; tension, semi tension and catenary systems.
2 Steering systems with various types of rudders and steering gear; bow thrusters and azimuth thrusters
3 Handling with different design solutions and propulsion and control systems of these devices
4 Emergency and rescue
5 Ramp, cargo port, watertight doors, hatches.
6 Fire, ballast, bilge and other systems etc.
7 Specialized and technological equipment, including: drilling, mining and other
8 Dynamic Positioning Systems

Zalecana lista lektur

Literatura podstawowa

1. Subrata K. Chakrabarti: Handbook of Offshore Engineering. New York 2005
2. Young Bai, Qiang Bai; Subsea Engineering. Hamdbook. Elsevier New York 2012
3. Przepisy towarzystw klasyfikacyjnych, w tym PRS i DNV

Literatura uzupełniająca

1. Cudny K.: Linie wałów okrętowych. Konstrukcja i obliczenia. Wydawnictwo Morskie, Gdansk, 1990.
2. Perepeczko A.: Okrętowe urządzenia sterowe.
3. Pawlicki K.: Elementy dźwignic. PWN, Warszawa, 1982
4. Stryczek S.: Napęd hydrostatyczny. Elementy i układy. WNT Warszawa
5. SzelangiewiczT.: Podstawy teorii projektowania kotwicznych systemów Utrzymywania pozycji jednostek pływających. Okrętownictwo i Żegluga, Gdańsk 2003

Metody i kryteria oceniania	Kryteria oceniania składowe	Próg zaliczeniowy	Procent składowej oceny końcowej

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Marine Applied Informatics, CAE and Design Tools II**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	2	3	5	MSc

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	15	-	45	-	-	60

Name of lecturer(s)	C. Żrodowski, K. Niklas, P. Dymarski, P. Flaszyński

Learning outcomes of the course unit

Student builds geometric models of real objects for numerical analysis
Student exports different forms of discretized models to a FEA program
Student understands and applies boundary conditions and loads to the model
Student performs FEM calculations
Student visualize and assesses results of FEM calculations

Prerequisites and co-requisites

???

Course contents

Exercising novel strength analysis, fatigue and CFD software students will gain practice in:

- creative design concepts
- calculations results assessment
- optimization
- prototyping
- parametric design of series of products
- manufacturing and life-cycle analysis
- realistic visualizations

Recommended and requiered reading

Basic literaturę

electronic and on-line manuals for NX, Creo-Parametric, Finemarine, ANSYS, Fluent, NASTRAN

Supplementary literaturę

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade

Subject name	Modelling and Simulation in Ocean Engineering II		
Subject code	O:096111		
Faculty	Department of Control and Power Engineering		
Course name	Ocean Engineering		
Learning area	technical sciences		
Learning profile	general academic profile	Study year	2
Type of subject	Obligatory	Study semester	3
Study level	Full-time studies postgraduate studies	ECTS	3

ECTS details

Activity	gk	pw
Lecture	15	
Laboratories	30	
Consulation	5	
Lecture studies		5
Test preparation		10
Laboratories preparation		10
Sum	50	25
Parameter ECTS	25	25
ECTS components	2	1
ECTS sum	3	

Name of lecturer	prof. dr hab. inż. Zygfryd Domachowski, prof. zw. PG mgr inż. Natalia Szewczuk-Krypa prof. dr hab. inż. Zygfryd Domachowski, prof. zw. PG
Subject objectives	mathematical modelling of wind, and wind-induced waves, and currets onto marine structures, mathematical modelling of marine stucture response to ocean disturbances

Learning outcomes

Course outcome	Subject outcome	Method of veryfication
K_U02	student applies all accessible means and methods in professional and social communication	[SK1] Assessment of group work skills [SU4] Assessment of ability to use methods and tools [SK4] Assessment of communication skills [SK3] Assessment of ability to organize work
K_U05	student is able to model and simulate the influence of wind, and wind-induced waves, and currents on marine structures, student is able to analyse the response of marine structure to ocean disturbances	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained in the different modules [SK5] Assessment of ability to resolve work-related problems [SU2] Assessment of ability to analyze information
K_W01	student is able to apply mathematical modelling and simulation in design, optimization, and diagnostics of technical systems	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained in the different modules [SK5] Assessment of ability to resolve work-related problems [SU2] Assessment of ability to analyze information
K_W02	student is conscious of ocean environmental inffluence	[SW1] Assessment of factual knowledge [SU3] Assessment of ability to use knowledge gained in the different modules [SU2] Assessment of ability to analyze information

Mode of delivery	at the university
Prerequisites	mathematical modelling background, stochastic process background

Recommended components	marine structures review
Subject contents	environmental disturbances (wind, wind-generated waves, currents), stochastic spectra, induced forces and moments, equtions of motion for dynamic structures, loads responses of dynamic stuctures, fatgue design method, fatigue damage
Recommended and required reading	**Required reading** 1. Fossen T.I. : Guidance and Control of Ocean Vehicles. John Wiley and Sons, Chichester, New York, Brisbane, Toronto, Singapore, 1994, 2. Hogben N., Dacunha N.M.C. : Global Waves Statistcs. British Maritime Technology Ltd, 1986, 3. Naess A., Moan T. : Stochastic dynamics of marine structures. Cambridge University Press, New York, 2013, 4. Spanos P.D (Editor) . : Probabilistic Offshore Mechanics. A Computational Mechanics Publication, 1985. **Recommended reading** Cooper G.R.: Probabilistic Methods of Signal and System Analysis

Planned learning activities

Lecture	Exercise	Laboratory	Project	Seminar	Sum
15	0	30	0	0	45

W tym nauczanie na odległość: 0.0

Assesment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
lecture - test, laboratory - reports	50.0	100.0

Example issues / example questions / tasks completed

Language of instructions	Polish
Work placement	Not applicable

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Reliability, Safety and Risk Analysis II**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	2	3	2	MSc

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	15	-	-	15	-	30

Name of lecturer(s)	Roman Liberacki

Learning outcomes of the course unit	The student defines the terms of reliability, safety and risk. The student identifies and explains the reasons for the application of basic mathematical models in reliability studies. The students calculate the reliability indexes of simple and complex structures. Student discusses the criteria for acceptable risk level. The student uses the method of assessing the probabilities of human errors. The student uses the methods prescribed in the FSA and QRA. Student discusses the procedures and technical means taken to ensure safety during the ships and their systems operation. Student presents ways to reduce the negative effects of the accidents at sea.
Prerequisites and co-requisites	No requirements
Course contents	The main terms of reliability and safety. Reliability of simple and complex objects. Physical aspects of reliability. Empirical indexes of reliability. Basic mathematical models for testing the reliability and safety of complex systems.. Risk and reliability analysis of technical systems. The terms of safety and risk. Risk as a measure of safety. The criteria for acceptable risk. The human factor and the risk. Methods of assessing human error probabilities. Formal safety assessment (FSA). Quantitative safety analysis (QRA). Procedures and technical means taken to ensure security during the operation of ships and their systems. Ways to reduce the negative effects of the accidents at sea.
Recommended and requiered reading	**Basic literature** 1. Brandowski A.: Nauka o bezpieczeństwie. Polit. Warszawska 1993. 2. Melnick E.: Encyclopedia of Quantitative Risk Analysis and Assessment. Viley & Sons. 2008. 3. Modarres M.: What Every Engineer Should Know about Reliability and Risk Analysis. New York, 1993. 4. Swain A.D., Guttman H.E.: Handbook of Human Reliability Analysis with Emphasis on Nuclear Power Plant Applications. Final Report, prepared for U.S. Nuclear Regulatory Commision. August, 1983. 5. IMO (MSC 66/INF.8): A methodology for formal safety assessment of shipping. 1996. **Supplementary literature** No reqiurements

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60%	50%
	Reports	100%	50%

Field of study	Oceanotechnika	Specialisation	Ocean Engineering
Course unit title	**Ship and Offshore Power Systems Design II**		

Course unit code	Year of study	Semester	Number of ECTS credit allocated	Type of course
	2	3	4	MSc

Planned learning activities and teaching methods	Lecture	Tutorials	Laboratory	Project	Seminar	Sum
	-	-	-	45	-	45

Name of lecturer(s)	Roman Liberacki, Damian Bocheński

Learning outcomes of the course unit	The student uses available computer programs used in the designing of the ship power plants and energy supply systems on platforms . The student sets the configuration of the propulsion system, electricity generating plant and selects steam boilers. The student designs auxiliary systems: cooling water system, lubricating oil system, liquid and gas fuel system , starting air system, steam heating system. The student designs general ship systems: ballast water system, bilge water system, fire fighting system, hydrophore and sanitary water system. The student designes electricity and heat supply systems, auxiliary systems, safety systems and living systems for offshore drilling plants.
Prerequisites and co-requisites	Knowledge of subjects: Environmental Protection, Propulsion and Power Transmision systems.
Course contents	The use of computer programs used in the designing of ship power plants and energy supply systems on platforms. Determining the configuration of the propulsion system. Determination the configuration of electricity generating plant. Selection of boilers. Designing of auxiliary systems: cooling water system, lubricating oil system, liquid and gas fuel system, starting air system, exhaust gas system, steam heating system. Designing of general ship systems: ballast water system, bilge water system, fire fighting system, hydrophore and sanitary water system. Designing of electricity and heat supply systems, auxiliary systems, safety systems and living systems for offshore drilling plants.
Recommended and requiered reading	**Basic literature** 1. Jamroż J., Wieszczeczyński T.,Swolkień T.:Projektowanie siłowni okrętowych. PG, Gdańsk, 1997. 2. Michalski R.:Siłownie okrętowe. PSz, Szczecin, 1987. 3. Wojnowski W.:Okrętowe siłownie spalinowe. Część III.Gdańsk, 1992. 4. PRS: Przepisy klasyfikacji i budowy statków morskich. Witryny internetowe: www.manbw.com; www.wartsila.com; www.alfalaval.com; www.imo.org **Supplementary literature** No reqiurements.

Assesment methods and criteria	Course passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60%	100% (2nd semester)
	Project	100%	100% (3rd semester)

Subject name	Professional Communication		
Subject code	O:096210		
Faculty	Language Centre		
Course name	Ocean Engineering		
Learning area	technical sciences		
Learning profile	general academic profile	Study year	2
Type of subject	Obligatory	Study semester	4
Study level	Full-time studies postgraduate studies	ECTS	4

ECTS details

Activity	gk	pw
Project	60	
Project consultation	5	
Report creation		5
Project creation		30
Sum	65	35
Parameter ECTS	25	25
ECTS components	2,6	1,4
ECTS sum	4	

Name of lecturer

mgr Agnieszka Jachowicz
mgr Agnieszka Jachowicz

Subject objectives

The seminar aims to provide the opportunity to gain confidence and competence in working in a professional environment where English is the language of communication. The aim of the seminar is to help students acquire the linquistic, communicative and socio-cultural skills needed to function comfortably in English in relation to their professional and social goals. The seminar is oriented towards communicative competence.

Learning outcomes

Course outcome	Subject outcome	Method of veryfication
		[SK1] Assessment of group work skills [SU5] Assessment of presentation [SW2] Assessment of presentation [SU1] Assessment of task fulfilment [SK3] Assessment of ability to organize work

Mode of delivery

at the university

Prerequisites

Students must have already attained at least the B1 level of their General English course.

Recommended components

English Language Circle, Debates in English, English Language Olympiad for Students of Technical Universities

Subject contents

Preparing presentations, writing various kinds of business letters, including CV and covering letter. Preparing for a job interview. Various topics from the field of psychology, such as verbal and non-verbal communication, personality types and psychological tests, risk in business, ethics in business, conflicts, negotiations, persuasions and manipulations. Communication on the Internet and other electronic media: Netiquette. Types of discussions and debates. Dress code, social events, cultural differences, business trips.

Recommended and required reading

Required reading

P. Domański, English in Science and Technology. Wydawnictwo Naukowo-Techniczne, Warszawa, 1996

S. Taylor, Model Business Letters, E-mails & Other Business Documents. Pearson, 2004

R. Lewis, When Cultures Collide. Nicholas Brealey Publishing, 2006

R. A. Day, How to Write & Publish a Scientific Paper. Cambridge University Press, 1993

Recommended reading

J. Bralczyk: "Wiem, co mówię, czyli o dobrej komunikacji." Oficyna Wydawnicza Branta, Bydgoszcz-Warszawa, 2011

Academic publications, dictionaries, scientific and science magazine articles. Online resources.

<table>
<tr><td>Planned learning activities</td><td>
<table>
<tr><th>Lecture</th><th>Exercise</th><th>Laboratory</th><th>Project</th><th>Seminar</th><th>Sum</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>60</td><td>0</td><td>60</td></tr>
</table>
W tym nauczanie na odległość: 0.0
</td></tr>
<tr><td>Assesment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>speaking, cooperation within the group</td><td>60.0</td><td>20.0</td></tr>
<tr><td>presentations</td><td>60.0</td><td>20.0</td></tr>
</table>
Example issues / example questions / tasks completed

Preparing for the topic of a presentation, and participation in it; discussing the given topic in the group; debate; discussing particular linquistic problems; role-playing; report.
</td></tr>
<tr><td>Language of instructions</td><td>English</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
</table>

Subject name	Engineering Design - group project II		
Subject code	O:096191		
Faculty			
Course name	Ocean Engineering		
Learning area			
Learning profile		Study year	2
Type of subject	true	Study semester	4
Study level	postgraduate studies	ECTS	6.0

Number of ECTS credits

Learning activity of student	gk	pw
Participation in didactic classes included in study plan	75	
Participation in consultation hours	20	
Self-study hours		55
Sum	95	55
Total number of study hours	150	
Number of ECTS credits	6.0	

Name of lecturer

Subject objectives

Learning outcomes

Course outcome	Subject outcome	Method of veryfication
K_K01		
K_K03		
K_K04		
K_K05		
K_K06		
K_K09		
K_U11		
K_U12		
K_U13		
K_U14		
K_U15		
K_W06		

Mode of delivery: at the university

Prerequisites

Recommended components

Subject contents

Recommended and required reading

Required reading

Recommeded reading

Lesson type and method of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar
Number of study hours	0.0	0.0	0.0	75.0	0.0
Total number of study hours per semester included in study plan	75.0				

e-learning hours included: 0.0

Assesment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	0.0	0.0

Example issues / example questions / tasks being completed

Language of instructions: Polish

Work placement: Not applicable

Subject name	MSc Thesis		
Subject code	O:096220		
Faculty			
Course name	Ocean Engineering		
Learning area			
Learning profile		Study year	2
Type of subject	true	Study semester	4
Study level	postgraduate studies	ECTS	20.0

Number of ECTS credits

Learning activity of student	gk	pw
Participation in didactic classes included in study plan	0	
Participation in consultation hours	30	
Self-study hours		470
Sum	30	470
Total number of study hours	500	
Number of ECTS credits	20.0	

Name of lecturer

Subject objectives

Learning outcomes

Course outcome	Subject outcome	Method of veryfication
K_K03		
K_K04		
K_K13		
K_U04		
K_U09		
K_U10		
K_U11		
K_U15		
K_U16		
K_W13		
K_W14		
K_W15		

Mode of delivery: at the university

Prerequisites

Recommended components

Subject contents

Recommended and required reading

Required reading

Recommeded reading

Lesson type and method of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar
Number of study hours	0.0	0.0	0.0	0.0	0.0
Total number of study hours per semester included in study plan	0.0				

e-learning hours included: 0.0

Assesment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	0.0	0.0

Example issues / example questions / tasks being completed

Language of instructions: Polish

Work placement: Not applicable