



POLISH NAVAL ACADEMY

named Westerplatte Heroes

FACULTY OF NAVIGATION AND NAVAL WEAPONS



COURSE CURRICULUM FOR ERASMUS+ FOREIGN STUDENTS

First degree studies

Major: navigation

Specialty: maritime navigation

*Applicable to students commencing their education
in the academic year 2018/2019*

GDYNIA

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1. GENERAL INFORMATION

1.1. PROFILE OF THE POLISH NAVAL ACADEMY

The Polish Naval Academy (PNA) is an academic higher education institution (HEI) and serves the defence and security of the Republic of Poland, the national economy, society and science through the education of students, staff development and conducting research.

The Polish Naval Academy is a state-owned HEI, supervised by the Minister of National Defence with the authority given to him by the national bill establishing the Polish Naval Academy, dated 27 February, 2003. It operates on the law concerning higher education system. The Academy offers 13 different fields of study and over 50 specializations in technical, humanities, as well as social sciences.

The Polish Naval Academy, named after the Westerplatte Heroes, in its present form, sanctioned by the Act of Law passed by the Polish Parliament, is a public higher education institution. Maritime education of officer-candidates and civilian students is the core activity and is related to national defence, state security and the maritime economy. A number of undergraduate (first-cycle) and graduate (second-cycle) courses, in the area of technical, social and humanities domain available to students constitutes the scope of the didactic offer. Recent extension of the educational offer has resulted in transferring the Academy from a regional, military-oriented institution into an all-accessible Academy where ca. four thousand students are studying full-time and part-time (extramural studies). Although the technology oriented courses still occupy the most prominent place, statistically social and humanities studies are more and more popular.

The presence of civilian students in the military Academy has not resulted in a change in its character. It still remains an institution which supports defence activities in all respects. Rational employment and the use of the school's potential show that defence is a term relatively broadly defined and open to people, who perceive the issues related to state matters in connection with defence. A few decades had to pass before it became clear that *"the armed forces as a power of the nation"* cannot be separated from this nation by a wall. Thus the school, along with education, creates a new social quality in the area of promotion

of defence as a mission of high public significance. The socio-economic changes and the necessity of permanent upgrading of qualifications have brought about the requirement for new educational services. These include postgraduate studies and the whole range of qualifying, refresh and specialized courses. The whole school's potential is engaged in carrying out these tasks. Most of them have a clear maritime related profile. The requirement for the permanent training of officers also stems from personnel development policies.

1.1.1. Location

Since 1946, PNA is located in Gdynia-Oksywie, in the northern part of Poland, with access to the Baltic Sea. The precise coordinates are - latitude 54° 32'N, longitude 018° 32'E.

1.1.2. History

PNA's beginnings trace back to the Naval Officers School established in Toruń on 1 October, 1922. It was situated far from the sea for practical reasons, especially for the lack of necessary infrastructure in the coastal region after years of occupation by foreign powers. The main idea behind the decisions made by the creators of naval schooling was the necessity to build the national officer corps, which would not have the record of service in the navies of the occupants, from the very basics. The dynamics of organizational development of the school was set by the requirements of the Polish Navy, whose presence marked the Polish reasons of state, so distinctly articulated in our history. Socio-political realities were not very favourable for pioneers of naval schooling. After years of successes, crowned with the first and successive graduations, the change in name of the school into Naval Cadets School, and the opening of a technical and administration faculty, there came the period of the difficult war-time test. On 12 September, 1939 the school was closed down, and the cadets were transferred to a newly established marine battalion, subject to Independent Operational Group "Polesie", commanded by two star general Franciszek Kleberg. Once again, during the period of less than twenty years, seamen contrary to their training, stood up to fight on land, just like their predecessors in 1920.

The Chief of Naval Authority, Rear-admiral Jerzy Świrski proudly underlined the fact that the Navy stands for "continuity, patience and traditions". His words proved true. At the end of November, 1939 the Naval Cadets School was reactivated on board the base ship Gdynia in the British naval base of Davenport near Plymouth. Transferred on shore to barracks

in Okehampton in December, 1944 the school continued to fulfil its mission until 1 December, 1946, i.e. the day when the Polish Navy in the West was disbanded. Difficult, sometimes dramatic administrative decisions did not break the continuity of training of naval personnel. On regaining independence, the experience earned during the Second Republic of Poland and years of war indicated that one of the most important tasks was to recreate the naval training system so that it could actively participate in the development process in the coastal region in its new geopolitical form. The mission was assigned to Capt. Adam Mohuczy, the organizer of Naval School in 1922 who as the commanding officer of this branch of the armed forces gave the mission top priority. On 18 January, 1946 the school commenced its activities under the old name. Its location in Gdynia-Oksywie was of utmost importance as it was close to the naval harbour which offered conditions for effective training. On 11 June, 1955 the Council of Ministers accorded the status of military Academy to the school. One year later inhabitants of Gdynia funded a banner which was handed over to the school on the day when it was solemnly named after the Westerplatte Heroes. They constitute a special symbol in our traditions. In the calendar of events related to Oksywie Alma Mater 17 July, 1987 occupies a special place. It was then that by the Act of Law passed by the Parliament the Academy was transformed into The Naval Academy. It has been functioning under this name up to day. Another significant change took place in 2003 when the Parliament extended its educational profile from exclusively military into military-civilian.

The history of the Academy is inseparably connected with the history of the Polish Navy, which clearly defined the mission of the Academy and its objectives with regard to education, personal development and research work. Professionalism, responsibility, sense of solidarity in maritime service and high job-related ethics are the traits which the academy passes over to its graduates. The realities, both historical and present, have proved that priorities have been properly set in the academy. It is these priorities that place the academy among institutions enjoying the public's confidence and respect.

1.2. PROFILE OF THE FACULTY OF NAVIGATION AND NAVAL WEAPONS

The Faculty of Navigation and Naval Weapons is one of four faculties of the Polish Naval Academy. Historically, Faculty of Navigation and Naval Weapons originates from the Maritime

Faculty established in 1923 as part of the Officers School of Navy. Through the decades, due to the continuously changing conditions of the navy officer profession, the name, structure and range of interest of the Faculty have evolved appropriately to the needs of real life.

Faculty of Navigation and Naval Weapons is the main centre that prepares the officers for the Polish Navy within the scope of - so called - maritime shipboard specialties. It is also one of the three main centres in Poland that prepares the personnel for the needs of the Polish Merchant Navy. Moreover, it is the only centre in Poland that prepares the graduates of the navigation major to work in maritime administration as well as in different central and local civil service institutions related to marine economy.

Among the Polish military schools, Polish Naval Academy and Faculty of Navigation and Naval Weapons itself was the precursor in the field of civilian students' education. First civilian students joined Faculty of Navigation and Naval Weapons in 1997. In the consecutive years, the Faculty offer for civilian students' education was and still is successively improved.

As for today, there are over 700 students on the Faculty out of whom about 600 study day-time and about 100 are extramural students. Currently there are also about 120 Polish military students and over 100 foreign military students. The academic staff of the Faculty comprises of 57 academic teachers including 15 professors, 22 PhDs of technical studies and 1 PhD of related fields of knowledge.

Providing the students with the first and second degree studies in navigation, since 1984 the Faculty has been entitled to award the doctoral degree in the field of technical studies, the discipline of geodesy and cartography. Furthermore, since 2008 the Faculty extended its didactic offer introducing new major for the first-degree studies: computer science. Besides, the Faculty offer also post-graduate studies in the field of hydrography.

The courses of studies are supported by scientific research, which results are of practical use in the process of improving the functioning of the Polish Navy, enhancing the security of the maritime navigation as well as the effectiveness of the enterprises of the Pomeranian region of Poland. They also strengthen the position of the Academy as the centre which forms intellectual and cultural department of its environment.

The Faculty maintains close contact with companies of marine economy, which resulted in signing appropriate cooperation agreements. Those, in turn, led to the possibilities of providing students' trainings which often turn out to be the first-time students learn about their future place of work and the specification of their profession. From the other hand - for

the companies - this form of cooperation allows to search appropriate employees for their needs.

The head of the Faculty is the Dean himself. There are also two deputy Deans: the Deputy Dean for Educational and Students Affairs and the Deputy Dean for Science. From the functional point of view the Faculty of Navigation and Naval Weapons consists of 4 organizational units: the Institute of Navigation and Maritime Hydrography, the Institute of Naval Weapons and Computer Science, the Department of Ship Exploitation and the Department of Hydroacoustics.

The Polish Naval Academy has its own, modern and adequately equipped didactic base. It comprises 127 teaching rooms with a total capacity over 4500 seats, including an auditorium and lecture halls (81), workshops (8), laboratories (15), training simulator (4), simulators (10) and a sport halls (2). Education facilities complement the newly constructed Academic Library & Auditorium Information Centre. It is the organizational unit which performs didactic, service and research tasks. It also serves as knowledge and culture centre to all interested. The library possesses a valuable collection of literature related to the heritage of Pomerania region and to the maritime character of this region. It is the only collection of publications of such a scale on naval operational art and tactics, marine navigation, naval history and naval technologies, history of the Polish Navy activity in WWII. The collections of the Main Library contain more than 180 000 volumes of books and more than 200 journals. Classrooms are equipped with audio visual appliances (computers, multimedia projectors, loudspeakers, screens, boards).

1.3. PROFILE OF THE STUDIES IN NAVIGATION

The navigation course fulfils the mission of the Polish Naval Academy which, within its didactic activity, strives to prepare the well-qualified watch-officer suitably to the demands of the contemporary maritime navigation. The didactic activity of the Academy takes fully into account international demands included in the *International Convention on Standards of Training, Certification and Watchkeeping (STCW)* what is confirmed by a proper certificate of the Minister of Marine Economy dated 24th of June 2016. In addition, starting from 1st of October 2001, the education process at the Faculty is certified to be the quality management ISO 9001:2008 compliant what is also confirmed by a proper certificate. Finally, the Polish

Naval Academy has got the accreditation of the *European Maritime Safety Agency (EMSA)* in the range of STCW Convention fulfilling for primary areas in the maritime economy.

The studies in major navigation are conducted according to Bologna Process – *First and Second Cycle Degree* and *The European Qualifications Framework – EQF Level 6*.

The process of preparing future watch-officers is long and complex. It comprises of compilation of predisposition, knowledge and abilities both general and specialised connected with, among others, the rules of national and international maritime conventions. Such a process of training a candidate for the professional watch-officer in connection with high health and psychophysical demands requires several years of studies.

The studies programme is prepared for the practical profile which allows for gaining abilities indispensable in the process of the professional career. It is focused on the contemporary knowledge concerning marine technology with the emphasis put on practical abilities. The navigation course fulfils the area of knowledge within the technical science.

1.4. RECRUITMENT RULES

Both males and females who completed schools of higher secondary education may apply for the admission, and they must possess:

1. Matriculation certificate (secondary school), higher education diploma (bachelor, engineer), affirmative result of qualifying procedure and other stated in a separate document.
2. Visa or residence permit card or any other document authorizing non-citizens to enter and temporarily remain within the territory of the Republic of Poland.
3. Health insurance policy for the period of study in the Republic of Poland.
4. ID copy certified by the Academy or a copy of some other ID document.
5. Language proficiency at least B1 level according to Common European Framework of Reference for Languages (CEFR).

1.5. CONTACT

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2. CHARACTERISTICS OF THE STUDIES PROGRAMME

Characteristics of studies

1. Major:
Navigation
2. Discipline of science:
Navigation is a branch (sub-discipline) in the discipline of technical sciences
3. Disciplines and sub-disciplines to which learning outcomes are related:
Learning outcomes refer to the discipline of technical sciences, sub-discipline geodesy and cartography, transport and machinery structure and construction and exploitation
4. Specialty:
Maritime navigation
5. Level of education:

First-degree studies (engineer)

6. Form of education:

Day-time studies

7. Profile of education:

Practical

8. Level of competency (according to STCW 78/95 Convention):

Operational level

9. Length of studies:

7 semesters

10. Overall number of contact hours:

3062

11. Overall number of ECTS points:

222

2.1. ORGANIZATIONAL GUIDELINES OF THE STUDIES

The basic forms of conducting classes include: lectures, exercises, laboratory activities and simulators. The subjects could be passed through an examination (E), a credit with the grade (Cg) or a credit without the grade (C). Particular didactic requirements are specified in the subjects' syllabuses. Should a particular subject include other classes forms (exercises, laboratories, simulators) apart from lectures, the student is permitted to participate in the examination or credit the lectures on condition that s/he has gained a satisfying grade in those other classes (exercises, laboratories, simulators) confirmed with a signature in the student's electronic record book.

The condition essential to complete studies is to fulfil all the didactic requirements included in the subjects' syllabuses as well as passing the final (degree) examination. The graduate, on completion of the Academy, obtains the title of an engineer and is capable of commencing the second-degree studies.

The aim of the study is to provide knowledge in the field of general and specialized science and the latest and most important content related to the safe use and handling of the Merchant Navy ships. Studies of the first-degree will have the following organizational form:

1. The Academy shapes the personal and professional traits as well as the knowledge and skills indispensable for the watch-officer in the continuous process from the moment of the admission to the Academy. Knowledge and skills defined for a graduate are evaluated according to didactic regulations described in the studies programme.
2. Any academic year comprises 2 semesters: a winter semester (W) and a summer semester (S). During each semester 14 weeks of classes in the Academy are anticipated, approx. 30 hours of classes per week.
3. During semesters, the Academy organizes courses – according to STCW 78/95 Convention – indispensable in order to obtain the certificate as the officer in charge of navigational watch on ships of 500 gross tonnage or more engaged in international voyages (operational level).
4. English language education in the Academy is programme-based and during the course each student takes a department examination. The graduate of the first-degree studies reaches the knowledge of the English language at B2 level according to Common European Framework of Reference for Languages.
5. During the 6th semester of study there is time to undergo professional training - indispensable in order to obtain the certificate as the officer in charge of navigational watch on ships of 500 gross tonnage or more engaged in international voyages (operational level).
6. In order to achieve the assumed education effects for the engineering undergraduate studies of navigation it is required to:
 - receive a credit for all classes included in the studies programme according to defined principles,
 - receive a credit for all courses included in the studies programme,
 - gain the number of ECTS points described in educational programme,
 - prepare and obtain a positive review of one's thesis,
 - submit an engineering paper as well as pass a diploma exam.

7. A graduate is awarded an Engineer's Diploma and s/he is granted the right to qualify for the second-degree studies.

2.2. LEARNING OUTCOMES

2.2.1. Major learning outcomes

Description of major learning outcomes, as specified by the resolution of the Senate of Polish Naval Academy No 19/2015 dated 26th of March 2015. The learning outcomes for the major in navigation are presented in Table 1.

Table 1. Learning outcomes for the major in navigation - first-degree studies

Symbol	After completing the first-degree studies in major in navigation the graduates will	Reference to learning outcomes in the field of technical sciences
Category of learning outcomes: KNOWLEDGE		
N1_W01	Have knowledge in mathematics, physics and other disciplines of science needed to formulate and solve problems relating to the studied discipline.	T1P_W01
N1_W02	Have general knowledge concerned with biosphere, physics of atmosphere and oceans, know the principles and nature of carrying out hydro-meteorological measurements.	T1P_W01
N1_W03	Have basic knowledge concerned with physical and chemical properties of carried cargoes and their characteristics.	T1P_W01
N1_W04	Have basic knowledge concerned with legal and economic characteristics of functioning of national and international economies.	T1P_W01
N1_W05	Demonstrate knowledge of labour law and fundamentals of law necessary to practice his profession.	T1P_W01
N1_W06	Have basic knowledge concerned with machinery structure and construction, material strength and engineering graphics.	T1P_W02
N1_W07	Have basic knowledge concerned with notions and rules in electrical engineering, electronics, automation and information technology.	T1P_W02
N1_W08	Have orderly general knowledge concerned with the main navigation-related issues.	T1P_W03
N1_W09	Understand performance and know principles relating to use of appliances and systems employed in navigation and communications, know procedures used to calibrate them and to assess their accuracy.	T1P_W03
N1_W10	Know distress, urgency and safety procedures for communication relating to general safety and safety at sea.	T1P_W03

N1_W11	Have general knowledge concerned with ship design and structure, systems and appliances, as well as principles of operating and maintaining them.	T1P_W03
N1_W12	Have elementary knowledge concerned with design, control and exploitation of propulsion systems in various exploitation conditions.	T1P_W03
N1_W13	Have general knowledge concerned with rules, regulations and procedures relating to transport of any cargoes, including loading operations, calculating amount of load, as well as all aspects of shipment safety.	T1P_W03
N1_W14	Have orderly general knowledge concerned with life and work safety, emergency procedures and rescue problems.	T1P_W03
N1_W15	Have knowledge necessary to understand global environmental problems, impact on environment made by human activity, and to promote awareness of necessity to protect it.	N1_W03
N1_W16	Have detailed knowledge concerned with information sources and ways of acquiring information relating to navigation hazards.	T1P_W04
N1_W17	Have detailed knowledge concerned with the structure of a chart, its symbols, and is capable of correctly interpreting it.	T1P_W04
N1_W18	Have detailed knowledge concerned with fixing an object's position, using all available methods.	T1P_W04
N1_W19	Be capable of correctly analysing and interpreting position accuracy.	T1P_W04
N1_W20	Have detailed knowledge concerned with planning a route, determining safe route and monitoring it in accordance with international rules.	T1P_W04
N1_W21	Know and understand his duties and principles of teamwork in typical navigation situations.	T1P_W04
N1_W22	Know, in detail, procedures to follow in situations posing hazard to human beings, cargo and environment, and knows how to avoid these hazards.	T1P_W04
N1_W23	Have extensive knowledge which enables him to use the English language for job-specific purposes at the level sufficient to communicate properly and effectively.	T1P_W04
N1_W24	Have basic knowledge concerned with life-cycle of technical appliances, objects and systems typical of his engineering discipline.	T1P_W05 InzP_W01
N1_W25	Know terminology used to produce instruction manuals, technical reports, order of materials and spare parts, expert opinions and a diagnostics assessment.	T1P_W05 InzP_W01
N1_W26	Know the main methods, techniques, tools and materials used to solve simple engineering problems relating to the studied discipline; know navigation publications, instruments, devices and appliances as well methods and techniques used to solve typical problems.	T1P_W06 InzP_W02
N1_W27	Know measuring instruments, methods for making measurements and observations in various aspects of operational and exploitation activity.	T1P_W06 InzP_W02
N1_W28	Have basic knowledge concerned with maintenance and configuration of appliances, objects and systems typical of navigation, including verification of their proper performance.	InzP_W03

N1_W29	Have basic knowledge concerned with technical standards and norms relating to his engineering discipline, recommended by organizations such as IMO, IHO, IEC, ISO.	T1P_W07 InzP_W04
N1_W30	Have international competencies: understands the effects and possibilities of internationalization of his professional community, understand cultural differences and be capable of working in an international team.	T1P_W08 InzP_W05
N1_W31	Have basic knowledge concerned with management, including quality management and management of a business organization.	T1P_W09 InzP_W06
N1_W32	Know and understand basic notions and principles relating to protection of industrial and intellectual property rights; be able to use information contained in patents.	T1P_W10
N1_W33	Have orderly specialized knowledge covering key issues in the studied specialty.	T1P_W03
Category of learning outcomes: SKILLS		
N1_U01	Be capable of independently using specialized job-specific literature available in traditional and digital forms, and the Internet; be capable of integrating, assessing and properly interpreting acquired information, and making inferences, formulating opinions and taking actions, based on it.	T1P_U01
N1_U02	Be able to communicate, using various techniques, including non-verbal ones, as well as technical means within his professional community and other communities.	T1P_U02
N1_U03	Be able to prepare well-documented analysis of issues relating to the studied discipline together with conclusions supported by evidence; be able to prepare a report and a multimedia presentation on an assigned topic relating to the studied discipline and teaching methodology.	T1P_U03
N1_U04	Be able to carry out an engineering project in accordance with the standards adopted in the program of study and chosen specialty.	T1P_U03
N1_U05	Have the ability to make a self-presentation during a job interview.	T1P_U04
N1_U06	Have the ability to independently study and work; demonstrate commitment to improving his professional and personal competencies on continuous basis, including language competencies.	T1P_U05
N1_U07	Have language skills for professional purposes, relating to the studied discipline, at level B2 in accordance with Common European Framework of Reference for Languages.	T1P_U06
N1_U08	Have the ability to effectively use information and communication technologies, including computer software, word editors, spreadsheets, reference data bases; be able prepare multimedia presentations.	T1P_U07
N1_U09	Be able to plan and carry out experiments, including computer-based simulations, statistically process collected data, interpret results and make inferences.	T1P_U08 InzP_U01
N1_U10	Be able to use analytic, simulation and experimental methods to formulate and solve job-related tasks.	T1P_U09 InzP_U02
N1_U11	Be able to integrate knowledge from different fields and disciplines, use systemic approach, taking also into account non-technical aspects in order to solve engineering problems.	T1P_U10 InzP_U03

N1_U12	Know the characteristics of the job of navigator and be capable of functioning in his job community; understand and use the principles of work safety and ergonomics.	T1P_U11
N1_U13	Be able to make a preliminary economic assessment relating to conducted engineering activity.	T1P_U12 InžP_U04
N1_U14	In the navigation process, critically analyse data obtained from navigation systems, understand limitations and errors relating to employed systems and properly evaluate the correctness of their performance.	T1P_U13 InžP_U05
N1_U15	Be able to identify and prepare a specification of simple engineering tasks of utilitarian nature, typical of the studied engineering discipline.	T1P_U14 InžP_U06
N1_U16	Be able to assess usefulness of routine methods and tools used to solve a simple engineering task of utilitarian nature, typical of the studied engineering discipline, choose and employ an appropriate method (procedure) and tools.	T1P_U15 InžP_U07
N1_U17	Be able to, in accordance with the presented specification, design or develop a simple appliance or process, typical of navigation, using appropriate methods, techniques and tools, as well as verify the correctness of the realization process, and determine the degree to which the design-related requirements have been fulfilled.	T1P_U16 InžP_U08
N1_U18	Be able to prepare a simple recording or measuring system, employing commonly used data transmission standards, especially NMEA system	T1P_W06 InžP_U08
N1_U19	Operate navigation and communication appliances as well as measuring instruments, make use of nautical and communication publications; be able to use communication procedures in emergency situations, for the purposes of general safety and safety at sea.	InžP_U07
N1_U20	Have experience relating to use of proper materials and tools to solve exploitation-based tasks, obtained during student practical training.	InžP_U09
N1_U21	Have knowledge and experience relating to maintenance of technical appliances and systems, earned during practical training, in laboratories and academy's workshops.	T1P_U17 InžP_U10
N1_U22	Have the ability to use, and experience in using engineering standards and norms, earned through studying and carrying out projects during tutorials, in laboratories, simulators and a job-specific environment.	T1P_U18 InžP_U11
N1_U23	Have experience relating to use of marine technologies, earned during training cruises.	InžP_U12
N1_U24	Have language for professional purposes skills, relating to the studied, discipline, at level B2 in accordance with Common European Framework for Languages.	T1P_U19
Category of learning outcomes: SOCIAL COMPETENCIES		
N1_K01	Be aware of the importance of and understand aspects and effects of engineering activity not relating to technology, especially on environment, and of his responsibility for making decisions relating to this activity.	T1P_K01 InžP_K01

N1_K02	Have the ability to work in a team, manage a small team, be aware of his responsibility for carried out tasks.	T1P_K02
N1_K03	Be able to appropriately define priorities in relation to executing tasks set by himself or someone else.	T1P_K04
N1_K04	Correctly identify and settle dilemmas relating to his practiced profession, especially, especially concerned with aspects of safety.	T1P_K05
N1_K05	Know and be able to observe economic and legal requirements relating to his professional activity.	T1P_K06 InžP_K02

The verification of educating and training effects is being made by juxtaposing them with assumed effects of the education defined for each of the subjects. Assumed effects resulting from carrying out the module of major subjects are being verified using the matrix of educating and training effects, described on the next side.

		N1_W01	N1_W02	N1_W03	N1_W04	N1_W05	N1_W06	N1_W07	N1_W08	N1_W09	N1_W10	N1_W11	N1_W12	N1_W13	N1_W14	N1_W15	N1_W16	N1_W17	N1_W18	N1_W19	N1_W20	N1_W21	N1_W22	N1_W23	N1_W24	N1_W25	N1_W26	N1_W27	N1_W28	N1_W29	N1_W30	N1_W31	N1_W32	N1_W33			
B.II.14	Safety of navigation														X					X		X						X	X			X					
B.II.15	Ship manoeuvring												X										X														
B.II.16	Ship's safety																		X				X									X	X				
B.III. Selective subjects																																					
B.III.1	English language for mariners																							X									X				
B.III.2	Polish language																																X				
B.III.3	Electrotechnics and marine electronics						X	X																						X							
B.III.4	Informatics							X																													
B.III.5	Geographical information systems																X	X	X								X	X				X					
B.III.6	Automatics						X	X																					X								
B.III.7	Marine power plants						X				X				X										X			X		X	X						
D. Thesis																																					
D.1	Methodology of thesis preparation																																				X
D.2	Thesis																																				X
E. Courses and trainings																																					
E.I.1	Navigation – ECDIS course								X	X							X	X			X																
E.I.2	Maritime communication – GMDSS course										X																		X			X					
E.I.3	Navigation instruments - ARPA									X				X																X							
E.II.1	Basic training in safety and security																							X			X				X	X					
E.II.2	First medical aid course																															X					
E.II.3	Proficiency in Survival Craft and Rescue Boats																															X					
E.II.4	Bridge resource management course																															X					
F. Professional trainings																																					
F.1	Professional training																							X	X	X	X	X	X	X		X	X				

		Category of learning outcomes: <i>SKILLS</i>																								<i>SOCIAL COMPETENCIES</i>				
		N1_U01	N1_U02	N1_U03	N1_U04	N1_U05	N1_U06	N1_U07	N1_U08	N1_U09	N1_U10	N1_U11	N1_U12	N1_U13	N1_U14	N1_U15	N1_U16	N1_U17	N1_U18	N1_U19	N1_U20	N1_U21	N1_U22	N1_U23	N1_U24	N1_K01	N1_K02	N1_K03	N1_K04	N1_K05
B. Module of major subjects																														
B.I. Common general subjects																														
B.I.1	Occupational safety and health			X												X											X			X
B.I.2	Mathematics																													
B.I.3	Physics																													
B.I.4	English language							X																	X		X			
B.I.5	Physical education																													
B.I.6	Chosen humanistic subjects																													
B.I.7	Intellectual property copyright								X																		X			
B.II. Common major subjects																														
B.II.1	Navigation I															X														
B.II.2	Marine environmental protection									X		X							X			X				X				
B.II.3	Maritime communication		X																											
B.II.4	Meteorology & oceanography	X														X					X				X					
B.II.5	Astronavigation															X						X								
B.II.6	Navigation II	X										X				X					X						X			
B.II.7	Navigation instruments															X					X	X		X						
B.II.8	Ship stability and structure	X																												
B.II.9	Marine transportation													X																
B.II.10	Maritime law																											X		X
B.II.11	Maritime search and rescue																				X							X		
B.II.12	Management of the ship	X	X									X								X						X		X	X	


		N1_U01	N1_U02	N1_U03	N1_U04	N1_U05	N1_U06	N1_U07	N1_U08	N1_U09	N1_U10	N1_U11	N1_U12	N1_U13	N1_U14	N1_U15	N1_U16	N1_U17	N1_U18	N1_U19	N1_U20	N1_U21	N1_U22	N1_U23	N1_U24	N1_K01	N1_K02	N1_K03	N1_K04	N1_K05
B.II.13	Planning of navigation trip	X												X			X		X	X								X	X	X
B.II.14	Safety of navigation	X																								X			X	
B.II.15	Ship manoeuvring																		X								X			
B.II.16	Ship's safety											X							X							X	X	X		
B.III. Selective subjects																														
B.III.1	English language for mariners	X	X					X																X		X				
B.III.2	Polish language	X	X																											
B.III.3	Electrotechnics and marine electronics																					X								
B.III.4	Informatics										X	X																		
B.III.5	Geographical information systems															X						X								
B.III.6	Automatics																X					X								
B.III.7	Marine power plants																					X								
D. Thesis																														
D.1	Methodology of thesis preparation					X	X		X			X																		
D.2	Thesis	X	X			X	X		X				X	X			X	X	X						X					
E. Courses and trainings																														
E.I.1	Navigation - ECDIS	X														X					X			X		X				
E.I.2	Maritime communication – GMDSS course		X																											
E.I.3	Navigation instruments - ARPA													X					X		X						X			
E.II.1	Basic training in safety and security																										X			
E.II.2	First medical aid course																											X		
E.II.3	Proficiency in Survival Craft and Rescue Boats																										X			
E.II.4	Bridge resource management course													X												X	X	X		
F. Professional trainings																														
F.1	Professional training				X										X							X	X	X						

2.3. SCHEDULE OF STUDIES

Major: navigation
Specialty: maritime navigation

MONTH (DECADE)	OCTOBER			NOVEMBER			DECEMBER			JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER																															
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III																													
1, 2 semester	Classes at Academy																															Holiday			Basic training in safety and security																														
3, 4 semester	Classes at Academy																															Holiday			First medical aid course			Proficiency in Survival Craft and Rescue Boats																											
5, 6 semester	Classes at Academy																															Holiday			Professional training																														
7 semester	Classes at Academy																															Holiday			Bridge resource management			Degree exam																											

SYMBOLS EXPLANATION:

-  Inauguration ceremony of the academic year
-  Classes at Academy
-  Holiday
-  Basic training in safety and security
-  First medical aid course
-  Proficiency in Survival Craft and Rescue Boats
-  Professional training
-  Bridge resource management
-  Degree exam

2.4. PLAN OF STUDIES

Index	Subject name	Number of hours						ECTS points	Obligatory / elective	Number of contact hours according to type					No of contact hours / requirements / ECTS points according to semester																
		required		planned						lectures	exercises	laboratories	simulators	total	1st year		2nd year				3rd year										
		PNA Senate	STCW	contact	preparation	total	In TC								I (W)	ECTS	Hours	Req.	ECTS	Hours	Req.	ECTS	Hours	Req.	ECTS	Hours	Req.	ECTS			
B. Module of major subjects		450	832	1945	1945	3890	156,5		704	949	251	41	1945	286	23,5	315	24	385	32	323	25,5	287	22,5	349	29						
I. Common general subjects		450	60	519	519	1038	37,5		175	320	24		519	134	10,6	194	14,5	104	8,6	44	2,5	14		29	1,5						
B.I.1	Occupational safety and health		15	15	30		1,5	O	10	5			15	15	Cg	1,5															
B.I.2	Mathematics	150		150	150	300	13	O	60	90			150	75	E	6,5	75	E	6,5												
B.I.3	English language	120	60	120	120	240	10	O	4	116			120	30	Cg	2,5	30	Cg	2,5	30	Cg	2,5	30	Cg	2,5						
B.I.4	Physical education	30		84	84	168		O	8	78			84	14	Cg		14	Cg		14	Cg		14	Cg							
B.I.5	Physics	75		75	75	150	6,5	O	30	21	24		75			45	Cg	3,5	30	E	3										
B.I.6	Chosen humanistic subjects	60		60	60	120	5	O	60				60			30	Cg	2	30	Cg	3										
B.I.7	Intellectual property copyright	15		15	15	30	1,5	O	5	10			15										15	Cg	1,5						
II. Common major subjects		772	833	833	1666	72			448	226	118	41	833	20		2	67	5,5	203	17,5	201	17	139	12	203	18					
B.II.1	Navigation I	91	100	100	200		8,5	O	43	25	32		100	20	Cg	2	45	Cg	3,5	35	E	3									
B.II.2	Meteorology & oceanography	41	42	42	84		3,5	O	25	7	10		42			22	Cg	2	20	Cg	1,5										
B.II.3	Maritime communication	15	16	16	32		1,5	O	10	1	5		16					16	Cg	1,5											
B.II.4	Astronavigation	75	84	84	168		7	O	35	40	9		84			42	Cg	3,5	42	Cg	3,5										
B.II.5	Navigation II + ECDIS	98	105	105	210		9	O	23	62	10	10	105			46	Cg	4	59	E	5										
B.II.6	Navigation instruments + ARPA	100	108	108	216		9,5	O	62	6	40		108			44	Cg	4	64	E	5,5										
B.II.7	Ship structure and stability	105	108	108	216		9	O	75	33			108					36	Cg	3	36	Cg	3	36	Cg	3					
B.II.8	Management of the ship	15	18	18	36		1,5	O	15	3			18									18	Cg	1,5							
B.II.9	Marine transportation	45	45	45	90		4	O	40	5			45									45	Cg	4							
B.II.10	Maritime law	20	22	22	44		2	O	20	2			22									22	Cg	2							
B.II.11	Ship's safety	15	18	18	36		1,5	O	15	3			18									18	Cg	1,5							
B.II.12	Marine environmental protection	10	11	11	22		1	O	10	1			11											11	Cg	1					
B.II.13	Maritime search and rescue	15	18	18	36		1,5	O	15	3			18										18	Cg	1,5						
B.II.14	Planning of navigation trip	37	40	40	80		3,5	O	5	23	12		40										40	Cg	3,5						
B.II.15	Safety of navigation	70	70	70	140		6,5	O	40	10		20	70										70	E	6,5						
B.II.16	Ship manoeuvring	20	28	28	56		2,5	O	15	2		11	28										28	Cg	2,5						
III. Selective subjects		593	593	1186	47				81	403	109		593	132	11	54	4	78	6	78	6	134	10,5	117	9,5						
B.III.1	English language for mariners	192	192	384		15	S	8	188				192	58	Cg	5	26	Cg	2	26	Cg	2	26	Cg	2	28	Cg	2	28	Cg	2
B.III.2	Polish language	200	200	400		15	S	8	194				200	74	Cg	6	28	Cg	2	28	Cg	2	28	Cg	2	28	Cg	2	14	Cg	1
B.III.3	Electrotechnics and marine electronics	48	48	96		4	S	24	4	20			48					24	Cg	2	24	Cg	2								
B.III.4	Automatics	24	24	48		2	S	10	8	8			24									24	Cg	2							
B.III.5	Geographical information systems	60	60	120		5	S	20	2	38			60									30	Cg	2,5	30	Cg	2,5				
B.III.6	Informatics	44	44	88		4	S	4	40				44									24	Cg	2	20	Cg	2				
B.III.7	Marine power plants	25	25	50		2	S	15	5	5			25										25	Cg	2						
C. Module of specialty subjects		315	307	622	27				164	73	78		315	86	7,5	72	6		50	4,5	107	9									
I. Common subjects		144	136	280	12,5				75	41	28		144	58	5	36	3		50	4,5											
C.I.1	Academic information systems	8		8		0,5	O	8					8	8	Cg	0,5															
C.I.2	Information Technology	30	30	60		2,5	O	10	5	15			30	30	Cg	2,5															
C.I.3	Legal system in Poland and academic regulations	20	20	40		2	O	16	4				20	20	Cg	2															
C.I.4	Seamanship	36	36	72		3	O	15	21				36			36	Cg	3													
C.I.5	Radar systems fundamentals and operation principles	32	32	64		3	O	16	3	13			32						32	Cg	3										
C.I.6	Tactical navigation	18	18	36		1,5	O	10	8				18						18	Cg	1,5										
II. Selective subjects		171	171	342	14,5				89	32	50		171	28	2,5	36	3					107	9								
C.II.1	Fundamentals of international public law	28	28	56		2,5	S	23	5				28	28	Cg	2,5															
C.II.2	Fundamentals of machine design and engineering drawing	36	36	72		3	S	18	18				36			36	Cg	3													
C.II.3	Marine hydrography	36	36	72		3	S	18	4	14			36									36	Cg	3							
C.II.4	Satellite navigation systems	35	35	70		3	S	12	1	22			35									35	Cg	3							
C.II.5	Sonar systems fundamentals and operation principles	35	35	70		3	S	18	4	14			35									35	Cg	3							
D. Thesis		30	30	60	6,5				4	26			30											30	6,5						
D.1	Methodology of thesis preparation		30	30	60		2,5	O	4	26			30											30	Cg	2,5					
D.2	Thesis					4	O																			4					
Total hours / ECTS points (in semester)		450	832	2290	2282	4572	190		872	1048	329	41	2290	372	31	387	30	385	32	373	30	394	31,5	379	35,5						
														exam - E	1		1		2		2		2		2						
														credit with grade - Cg	10		10		11		9		14		13						
														credit - C																	

3. SYLLABUSES

3.1. MODULE OF MAJOR SUBJECTS

3.1.1. Common general subjects

B.I.1 Occupational safety and health

Number of hours

Semester	Number of hours								Obligatory / selective	Requirements	ECTS points
				contact hours according to type							
	contact	preparation	total	lectures	exercises	laboratories	simulators	total			
0	0	0	0					0			
I	15	15	30	10	5			15	O	Cg	1,5
II	0	0	0					0			
III	0	0	0					0			
IV	0	0	0					0			
V	0	0	0					0			
VI	0	0	0					0			
VII	0	0	0					0			
Ogółem	15	15	30	10	5	0	0	15			1,5

Study contents

Conventional and sui generis sources of Labour law. Introduction to European and Polish Labour Law and labour protection. The system of labour/work protection in Poland and its goals. Main occupational safety regulations. Employer's (rector's) responsibilities in the area of providing safe and healthy conditions for studying. Student's rights and responsibilities in the area of occupational safety and health. General conditions and threats connected with operating machinery and working with electric appliances and electric installations. Penalties for non-compliance to the occupational safety and health regulations and principles. Fundamental laws concerning accidents while conducting academic classes. Definition and types of accidents. Methods of conduct in case of accident. Post-accident documentation. Compensations. Environmental hazards which can lead to an accident or illness. Division into arduous and harmful health factors. Risk alleviation methods.

Learning outcomes

After completing the module, a student knows fundamental OSH regulations observed in Poland and knows how to behave safely during didactic classes. A student should also know how to behave in case of accident and how to administer first aid to casualties/victims; additionally, acquire knowledge concerning legal possibilities in the area of insurance claims.

B.I.2 Mathematics

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Mathematics (O)
2. Code of subject:	Ma
3. Department:	Department of mathematics and physics
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	I, II
10. Profile:	Practical
11. Lecturer:	PhD Agata Zaleska-Fornal, PhD Kornelia Bernaciak
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	Acquainting students to forms and operations on complex numbers.
A2	Acquainting students to algebra of matrices.
A3	Teaching students of solving systems of linear equations.
A4	Training students in vector calculus.
A5	Teaching students of definitions and properties of elementary functions.
A6	Acquainting students to idea of limit and continuity.
A7	Acquainting students with the definition and properties of derivative.
A8	Teaching students of idea and ways of computing antiderivatives.
A9	Teaching students of idea and ways of computing definite and improper integrals.
A10	Training students in application of the definite integrals in geometry and physics.
A11	Acquainting students to idea and properties of partial derivatives of two-variables function.
A12	Training students in application of the partial derivatives.
A13	Acquainting students to idea of the definite integral of a function over plane region.
A14	Training students in application of the definite integral of a function over plane region.
A15	Acquainting students to definition and tests for convergence of series.
A16	Acquainting students to the idea of probability space, basic theorems and methods of computing probabilities of random events.
A17	Acquainting students to definition of random variable and distributions of discrete and continuous type.
A18	Acquainting students to the basic concepts of descriptive statistics and methods of point and interval estimation.
A19	Training students in application of statistical tests to verify statistical hypothesis.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Basic knowledge of math.
LEARNING OUTCOMES	
LO1	Student knows the algebraic and trigonometric form of complex numbers, can perform the elementary operation on them and is able to solve the polynomial equations.

LO2	Student knows the concept of matrix and determinant, can calculate the determinants, performs operations on matrices, finds the inverse matrix and solves the elementary matrix equations.
LO3	Student can solve the system of linear equation by Cramer's theorem, with inverse matrix and by row operations.
LO4	Student knows the operations on vectors. He can calculate scalar, cross and triple product and use them in elementary geometry.
LO5	Student knows the definitions and properties of elementary functions. Can sketch graph of the function. Can solve the elementary equations and inequalities.
LO6	Student knows the idea of limit and continuity of the function.
LO7	Student knows the definitions and general theorems of differential calculus. Can apply them in geometry and physics.
LO8	Student knows the definitions and general theorems of integral calculus. Can apply them in geometry and physics.
LO9	Student knows how to calculate partial derivatives of the function. Can apply differential to approximate the change of the function and determine the extrema of two-variable function.
LO10	Student knows the definition of the definite integral of a function over plane region. Can compute it introducing rectangular and polar coordinates.
LO11	Student can apply double integral in geometry and physic.
LO12	Student knows the definition of number and functional series. Can check the convergence of it using various criteria. Knows the approximation of elementary function by power series.
LO13	Student understands the idea of probability space. Knows basic terms of combinatorics and can compute the probability of random events.
LO14	Student knows definition of random variable, knows one and two-variable distributions of discrete and continuous type.
LO15	Student knows the basic concepts of descriptive statistics.
LO16	Student can compute point and interval estimators of parameters of the distribution.
LO17	Student can apply statistical tests to verify statistical hypothesis.

STRUCTURE OF SUBJECT

	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	4	EX1	4				
LO2	LEC2	4	EX2	4				
LO3	LEC3	2	EX3	4				
LO4	LEC4	2	EX4, EX5	4				
LO5			EX4, EX5	4				
LO6	LEC5, LEC6	2	EX6	2				
LO7	LEC6, LEC7	8	EX7, EX8	8				
LO8	LEC8-LEC10	8	EX9-11	15				
LO9	LEC11	4	EX12-14	4				
LO10	LEC12	4	EX15	4				
LO11	LEC13	4	EX16	2				
LO12	LEC14	4	EX17-19	14				
LO13	LEC15	4	EX20	4				
LO14	LEC16	4	EX21	4				
LO15	LEC17	2	EX22	4				
LO16	LEC18	2	EX23	3				
LO17	LEC19	2	EX24-27	6				
Total hours		60		90		0		0

SUBJECT MATTER CONTENT	
LEC1	Complex numbers (4).
LEC2	Matrices and determinants (4).
LEC3	Systems of linear equations (2).
LEC4	Vectors (2).
LEC5	Limit and continuity of a function (2).
LEC6	The derivative of a function (4).
LEC7	Applications of the derivative (4).
LEC8	Indefinite integral (4).
LEC9	Definite and improper integral (2).
LEC10	Applications of the definite integral (2).
LEC11	Partial derivatives and differential (4).
LEC12	Double integral (4).
LEC13	Applications of double integral (4).
LEC14	Series (4).
LEC15	Probability space (4).
LEC16	Distribution and parameters of random variable (4).
LEC17	Descriptive statistics (2).
LEC18	Point and interval estimation (2).
LEC19	Verification of statistical hypotheses (2).
EX1	Operations on complex numbers (4).
EX2	Matrices and determinants (4).
EX3	Solving of systems of linear equations (4).
EX4	Operations on vectors (4).
EX5	Test no 1 (2).
EX6	Elementary functions (2).
EX7	Limit and continuity of a function (2).
EX8	Taking derivatives (4).
EX9	Applications of the derivative (4).
EX10	Computing of indefinite integrals (4).
EX11	Computing of definite and improper integrals (7).
EX12	Applications of the definite integral (2).
EX13	Test no 2 (2).
EX14	Partial derivatives and differential (2).
EX15	Extrema of a function of two variables (2).
EX16	Computing of double integral (4).
EX17	Applications of double integrals (2).
EX18	Number series (4).
EX19	Functional series (8).
EX20	Test no 3 (2).
EX21	Computing of probabilities of random events (4).
EX22	Random variables (4).
EX23	Two- dimensional random variables (4).
EX24	Descriptive statistics (3).
EX25	Point and interval estimation (2).
EX26	Verification of statistical hypotheses (2).
EX27	Test no 4 (2).
TEACHING AIDS	

1	Lecture with multimedia presentation.								
2	Instruction.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Students activity (LO1 - LO17).								
F2	Solving of computational problem (LO16 - LO17).								
S1	Test no 1 (LO1 - LO5).								
S2	Test no 2 (LO6- LO8).								
S3	Test no 3 (LO9 - LO12).								
S4	Test no 4 (LO13 - LO17).								
S5	Exam (LO1 - LO8).								
S6	Exam (LO9 - LO17).								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	75	75	0	0	0	0	0	150
<i>Lectures</i>		30	30						60
<i>Exercises</i>		45	45						90
<i>Laboratories</i>									0
<i>Simulator</i>									0
Student work:	0	75	75	0	0	0	0	0	150
<i>Preparation for classes</i>		75	75						150
TOTAL NUMBER OF HOURS	0	150	150	0	0	0	0	0	300
Number of ECTS points		6,5	6,5						13
LITERATURE									
Basic									
1	Stewart J.: <i>Calculus early transcendentals</i> , Brooks/Cole Publishing Company, 1995.								
2	Stein K.S.K.: <i>Calculus and Analytic Geometry</i> , McGraw-Hill Book Company, 1987.								
3	Ross S.: <i>Probability</i> , Prentice-Hall Inc, 1998.								
4	Gnedenko B.: <i>The theory of probability</i> , Mir Publishers, Moscow 1982.								
Recommended									
1	Żakowski W.: <i>Matematyka</i> , cz. 1, WNT, Warszawa 2002.								
2	Żakowski W., Kołodziej W.: <i>Matematyka</i> , cz. 2, WNT, Warszawa 2002.								
3	Żakowski W., Leksiński W.: <i>Matematyka</i> , cz. 4, WNT, Warszawa 1982.								
4	Trajdos T.: <i>Matematyka</i> , cz. 3, WNT, Warszawa 1974.								
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Kornelia Bernaciak, nelaber@wp.pl								
2	Agata Załęska-Fornal, a.fornal@amw.gdynia.pl								

B.I.3 English language

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	English language (O)
2. Code of subject:	
3. Department:	Language Department
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	I, II, III, IV
10. Profile:	Practical
11. Lecturer:	PhD Kazimierz Szczepański, PhD Daria Łęska-Osiak
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	The course is aimed at students who need to improve their English significantly to guarantee success in higher education. It is to provide them with the necessary knowledge, skills and social competences.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Independent user at level B1 and above.
LEARNING OUTCOMES	
LO1	Has sufficient knowledge on the place and significance of foreign languages in the system of sciences and their subject-related characteristics.
LO2	Knows the basic terminology characteristic of studied program.
LO3	Knows and understands basic notions and regulations concerning industrial and intellectual property rights.
LO4	Is aware of the complexity nature of the language and changing nature of its notions.
LO5	Possesses language skills characteristic of an independent user at level B2 and above as described in Common European Framework of Reference for Languages.
LO6	Can independently use his knowledge utilizing dictionaries, lexicons and other conventional and digital sources of information.
LO7	Can seek for, analyse, assess and select data from a variety of sources.
LO8	Can produce written texts related to his area of study.
LO9	Can prepare and deliver presentations in English concerned with his area of study.
LO10	Is aware of his knowledge and skills, and necessity to constantly upgrade them in the context of his trade.
LO11	Understands the necessity of life-long learning.
LO12	Can work in a team, assuming various roles when participating in joint projects and discussion.
LO13	Effectively organizes his own and other people's work, and can critically assess its priorities and level of progress.
LO14	Can upgrade and improve the acquired knowledge and skills.
STRUCTURE OF SUBJECT	

	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours	
LO1	LEC1	4	EX1-30	116					
LO2									
LO3									
LO4									
LO5									
LO6									
LO7									
LO8									
LO9									
LO10									
LO11									
LO12									
LO13									
LO14									
Total hours		4		116		0		0	

SUBJECT MATTER CONTENT

LEC1	Introduction (4).
EX1	Talking about present events (4).
EX2	Present simple and present continuous (4).
EX3	Talking about past events (4).
EX4	Past simple and past continuous (4).
EX5	Present perfect simple and present perfect continuous (5).
EX6	Talking about future events (5).
EX7	Decisions, plans and arrangements (5).
EX8	Asking and answering questions in the academic context (5).
EX9	Developing communication skills based on Naval Academy's realities (5).
EX10	Comparing and contrasting (5).
EX11	Suggestions, orders and advice (5).
EX12	Education (5).
EX13	Stating facts and opinions (5).
EX14	Writing short functional texts (5).
EX15	Revision and Consolidation (2).
EX16	Progress Evaluation (2).
EX17	Using a monolingual dictionary (3).
EX18	Cause and result (3).
EX19	Preparation for academic study (5).
EX20	Preparing and taking part in a seminar discussion (5).
EX21	Summarizing and reporting on a seminar discussion (4).
EX22	Passives (3).
EX23	Description and definition (3).
EX24	Reading and understanding short informative texts (4).
EX25	Listening to a lecture (5).
EX26	Arguing and persuading (5).
EX27	Writing a summary (4).
EX28	Recognizing and understanding key factual information in a written text and a lecture (4).

EX29	Revision and Consolidation (2).								
EX30	Progress Evaluation (2).								
TEACHING AIDS									
1	Classware.								
2	Teacher's book.								
3	Recordings.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
S1	Average grade for progress attained (50%).								
S2	End of semester test (50%).								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	30	30	30	30	0	0	0	120
<i>Lectures</i>		1	1	1	1				4
<i>Exercises</i>		29	29	29	29				116
<i>Laboratories</i>									0
<i>Simulator</i>									0
Student work:	0	30	30	30	30	0	0	0	120
<i>Preparation for classes</i>		30	30	30	30				120
TOTAL NUMBER OF HOURS	0	60	60	60	60	0	0	0	240
Number of ECTS points		2,5	2,5	2,5	2,5				10
LITERATURE									
Basic									
1	Textbook – pre-intermediate, intermediate, upper-intermediate level.								
2	Workbook – intermediate level.								
3	The Guardian Weekly - One Stop English.								
4	Authentic materials available in the Internet – British Council Learning Zone, One Stop English, BBC, CNN Student News.								
5	Navy Career Path.								
6	Academic English – intermediate (CUP or OUP).								
Recommended									
1									
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Kazimierz Szczepański, k.szczepanski@amw.gdynia.pl								
2	Daria Łęska-Osiak, d.osiak@amw.gdynia.pl								

B.I.4 Physical education

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Physical education (O)							
2. Code of subject:	Kt							
3. Department:	Military department							
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	I, II, III, IV, V, VI							
10. Profile:	Practical							
11. Lecturer:	MSc Dariusz Sapiejka, PhD Piotr Górski, MSc Arkadiusz Sobieraj, MSc Olek Steciuk, MSc Tybura Sławomir							
12. Date of update:	10 March, 2018							
<i>* O/S – obligatory / selective</i>								
AIM OF SUBJECT								
A1	To acquaint students with fundamental safety regulations governing PE classes.							
A2	To raise students' level of the basic motoric features i.e. speed, resistance, strength. To prepare student's fitness for the officer's exam and the annual PE cadre exam.							
A3	To develop skills to conduct PE classes with a platoon of soldiers.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Ability to work in a team.							
2	Skill to conduct PE classes with a platoon of soldiers.							
LEARNING OUTCOMES								
LO1	The student knows the basic safety regulations governing PE classes considering the specificity of the class: sports hall, swimming pool, gym, classes in the open area.							
LO2	The student knows and is able to apply assistance and safety measures during physical exercises considering the specificity of basic gymnastics tools: bar, parallel bars, vaulting box, random exercises.							
LO3	The student is able to conduct classes with a group of soldiers following the methodology, applying the safety regulations, he demonstrates proper attitude as the leading person, he keeps the discipline and involvement of the group.							
LO4	After the training period, the student achieves higher results in basic measuring tests i.e. running, jumping, throwing, weightlifting, swimming. The student knows the norms for passing the annual PE exams in his age group and he is able to present norms for all other age groups and cadre groups. He does the physical exercises that are obligatory in the annual cadre exams correctly achieving very good results for the commanders of sub-units in his age group.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	3	EX1,15,37	3				
LO2			EX34-46	12				
LO3	LEC2	3	EX7,8,35	2				

LO4			EX1-63	61				
Total hours		6		78		0		0
SUBJECT MATTER CONTENT								
LEC 1	Safety regulations governing PE classes with reference to the specificity of the place (sports hall, swimming pool, open area), including the safety measures and self-safety measures during performing the exercises.							
LEC 2	Methodology of conducting PE classes.							
I. OUTDOOR ATHLETICS - 20 hours								
EX1	Perfecting classes: ordering exercises; running and jumping exercises; exercises done while running and marching.							
EX2	Perfecting classes: ordering exercises; exercises perfecting agility and speed, exercises done while running and marching; running at a pace.							
EX3	Developing running resistance and speed resistance: ordering exercises; long run intertwining with march; long run at various paces, intertwining training.							
EX4	Developing marching and running resistance: long run in the open area, run on the treadmill – measuring the time.							
EX5	Developing running resistance in the open area: covering natural obstacles; covering short distances competing, multijumps.							
EX6	Developing running resistance in the open area: long run - covering the obstacles.							
EX7	Regular running game: developing exercises, stretching exercises, coordinating exercises, weight exercises with a partner, running at a set pace, free run.							
EX8	Extended running game: developing exercises, stretching exercises, coordinating exercises, weight exercises with a partner, running at a set pace, free running covering a given distance.							
EX9	Intwining resistance training in groups: covering given distances; exercises during breaks; checking and correcting the load.							
EX10	Intwining resistance training in groups: covering given distances - competing; exercises during breaks; checking and correcting the load.							
EX11	Small running game focusing on speed and dynamism: free run; exercising during the march and run; exercises in a line and in a file; situational start; accelerating.							
EX12	Developing running resistance during speed and agility games: races in files; changing the start position; start at a signal; exercises with a partner.							
EX13	Developing running and marching resistance: run at a slow speed 400-500m intertwining with jumping exercises and suppleness exercises; covering given distances accelerating.							
EX14	Developing running and marching resistance: running training - running at a pace; covering distances; covering a set distance.							
II. SWIMMING – 20 hours								
EX15	Elementary swimming: assessment of swimming skills.							
EX16	Elementary swimming: exercises by the pool, games adapting to water; exercises by the side of the pool.							
EX17	Elementary swimming: exercises by the pool and in water; learning how to breathe; walking on the bottom of the pool.							
EX18	Elementary swimming: auxiliary exercises for breaststroke; sliding ahead; with help from the partner.							
EX19	Elementary swimming: auxiliary exercises for backstroke; sliding on breast and back.							
EX20	Elementary swimming: exercises preparing for swimming underwater vertically and horizontally.							
EX21	Elementary swimming: swimming underwater - pushing off the side of the pool using only arms; only legs; swimming underwater across the pool							

EX2 2	Elementary swimming: swimming underwater covering a distance, task swimming – fishing out an object.
EX2 3	Elementary swimming: exercises for backstroke; legs and arms movements with and without the kick board.
EX2 4	Elementary swimming: perfecting the backstroke; covering a distance at a set pace.
EX2 5	Elementary swimming: breaststroke - focusing on the coordination.
EX2 6	Elementary swimming: swimming - focusing on the coordination of crawl.
EX2 7	Elementary swimming: backstroke swimming - focusing on the coordination.
EX2 8	Elementary swimming: perfecting the crawl and backstroke swimming -covering the distance up to 25m.
EX2 9	Elementary swimming: start jump for the crawl, start jump for the backstroke and rescue jump.
EX3 0	Perfecting the learned elements: medley stroke.
EX3 1	Perfecting the learned elements: relay.
EX3 2	Practical swimming: learning how to tow a drowning person, swimming with clothes on, swimming carrying an object (rifle dummy).
EX3 3	Basic swimming: swimming skill test - 25m free style; swimming under water.
III. GYMNASTICS – 12 hours	
EX3 4	General classes: exercises shaping in all planes when marching, running and in a file; exercises with a partner.
EX3 5	Classes conducted in a big circle: shoulder circles, swings, arm back swings at different planes, pull-ups on a bar; arms bending on parallel bars; jumping (both legs simultaneously) over a bench with a med ball; jumping (both legs simultaneously over hurdles).
EX3 6	Classes conducted in a small circle – element of gymnastics test scope I and II: exercises on a high bar and a low bar; random exercises; selected exercises on parallel bars, jumps over a vaulting box.
EX3 7	Combined classes: 2 – 3 small circles; games; 3 – 4 file using the equipment in the hall.
EX3 8	Classes conducted in a small circle: shoulder circles, front to back swings, arm back swings; stretching exercises at ladders; exercises with a partner; exercises with med balls.
EX3 9	Classes conducted in a small circle: perfecting the learned tests exercises scope II and scope II; control and assessment of fitness.
EX4 0	Classes based on gymnastics tests: elements of exercises included in racing agility test and racing strength test.
EX4 1	Classes conducted with students moving in a file: speed and agility exercises; jumps, forward/backward rolls; exercises with a med ball and dumb bells.
EX4 2	Developing classes in a big circle: exercises on ladders; hanging, propping up, bending with a med ball; exercises with a bar and parallel bars, jumps.
EX4 3	Control and fitness assessment: racing strength test.
EX4 4	Control and fitness assessment: racing agility test.
EX4 5	Control and fitness assessment: scope I.
EX4 6	Control and fitness assessment: scope II.
IV. VOLLEYBALL – 12 hours	
EX4 7	General classes - technique of volleyball: moving on the course; bumping and passing the ball with both hands bumping the ball in pairs; block-abuse technique.

EX4 8	General classes - technique of volleyball: moving on the course; perfecting bumping and passing the ball; serve, reception/pass.								
EX4 9	General classes - technique of volleyball: perfecting the learned elements; setting and attack.								
EX5 0	General classes - technique of volleyball: perfecting the learned elements, dump, training game.								
EX5 1	General classes - technique of volleyball: perfecting the learned elements; defence exercises; exercises by playing short fragments of the game.								
EX5 2	A school game and a real game: rules and refereeing.								
V. BASKETBALL – 7 hours									
EX5 3	Technique of basketball - general classes exercising the individual technique-learning of the basketball posture; ways of moving on the field; learning of passing the ball and catching the ball; bouncing the ball in one place, bouncing when walking and when running.								
EX5 4	Technique of basketball - general classes: passing the ball between two players; a lay-up; throws from the spot, throws when jumping.								
EX5 5	Technique of basketball - general classes: learning of making an easy feint; freeing from the opponent.								
EX5 6	Technique of basketball: exercising special fitness; passing the ball with one hand; passing the ball on the bounce.								
EX5 7	Tactics of basketball: dribbling the ball in pairs and in threes; covering and attack.								
EX5 8	Tactics of basketball: perfecting all the technical elements in parts of the game.								
EX5 9	A school game and a real game: rules and refereeing.								
VI. FOOTBALL – 7 hours									
EX6 0	General classes of football technique: exercises of individual technique; ways of moving on the football pitch; developing running resistance; developing the speed.								
EX6 1	General classes of football technique: passing the ball between two players in the same place and when running; games developing individual technique.								
EX6 2	Tactics of indoor football: perfecting all technical elements in parts of the game.								
EX6 3	A school game and a real game: rules and refereeing.								
TEACHING AIDS									
1	Sports hall, track and field stadium, swimming pool.								
2	Heavy equipment: ladders, bar, parallel bars, vaulting boxes, exercise mats, small benches etc.								
3	Tools and light equipment: balls for team games, medicine balls, flags, boxing gloves, shields, dummy weapons etc.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Test (20%) (LO1 - LO3).								
F2	Assessment of practical skill of conducting classes (30%) (LO3).								
F3	Physical fitness exam (50%) (LO4).								
S1	Weighted Average Rating Factor $S1 = (0,2 F1 + 0,3 F2 + 0,5 F3)$.								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	14	14	14	14	14	14	0	84
<i>Lectures</i>		1	1	1	1	1	1		6
<i>Exercises</i>		13	13	13	13	13	13		78
<i>Laboratories</i>									0

<i>Simulator</i>									0
Student work:	0	14	14	14	14	14	14	0	84
<i>Preparation for classes</i>		14	14	14	14	14	14		84
TOTAL NUMBER OF HOURS	0	28	28	28	28	28	28	0	168
Number of ECTS points									0
LITERATURE									
Basic									
1									
Recommended									
1	Organizacja i metodyka prowadzenia zajęć z wychowania fizycznego, MON, Warszawa 1974.								
2	Tudor O. Bompá: Teoria planowania treningu. Warszawa 1990.								
3	Czabański B.: Nauczanie techniki pływania. Wrocław 1977.								
4	Buchholz M.: Piłka siatkowa. Gdańsk 1989.								
5	Neumann H.: Trening Koszykówki 1990.								
6	Zaremba Z.: Nowoczesny trening biegów średnich i długich. Warszawa 1976.								
7	Kopeć W., Tarnawski P.: Podręcznik metodyczny do programu walki w bliskim kontakcie dla żołnierzy sił zbrojnych Rzeczypospolitej Polskiej.								
8	Sozański H., Witczak T.: Trening szybkości. Warszawa 1981.								
9	Kaczyński A.: Atlas gimnastycznych ćwiczeń siłowych. Wrocław 2001.								
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Dariusz Sapiejka + team, d.sapiejka@amw.gdynia.pl								

B.I.5 Physics

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Physics (O)
2. Code of subject:	Qmf
3. Department:	Department of mathematics and physics
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	II, III
10. Profile:	Practical
11. Lecturer:	MSc Bartłomiej Kruszewski
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	The introduction of fundamental physics quantities and the International System of Units. Introduction with quantities describing motion in a straight line. Teaching students how to solve tasks.
A2	The Introduction of quantities describing projectile motion and circular motion. Teaching students how to solve tasks.
A3	The Introduction of quantities describing Newtonian mechanics. Teaching students how to solve tasks.
A4	The Introduction of quantities describing rolling motion. Teaching students how to solve tasks.
A5	The Introduction of quantities describing energy and work in a translational and rotational motion. Teaching students how to solve tasks.
A6	The Introduction of quantities describing conservation of mechanical energy, conservation of linear momentum, conservation of rotational momentum in physics. Teaching students how to solve tasks.
A7	The Introduction of quantities describing fluids. Teaching students how to solve tasks using Archimedes' Principle.
A8	The Introduction of quantities describing hydraulic engineering. Teaching students how to solve tasks.
A9	The Introduction of quantities describing oscillations and simple harmonic motion. Teaching students how to solve tasks.
A10	The Introduction of quantities describing damped and forced simple harmonic motion. Teaching students how to solve tasks.
A11	The Introduction of quantities describing waves. Teaching students how to solve tasks.
A12	The Introduction of quantities describing thermodynamics. Teaching students how to solve tasks.
A13	The Introduction of quantities describing electric fields. Teaching students how to solve tasks.
A14	The Introduction of quantities describing magnetic fields. Teaching students how to solve tasks.
A15	The Introduction of chosen elements of modern physics.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Knowledge of fundamental mathematics needed to pass secondary school certificate.

2	Knowledge of fundamental physics needed to pass secondary school certificate.							
LEARNING OUTCOMES								
LO1	Student knows fundamental SI units. Student knows which physics quantities are vectors and which are scalars. Student knows and is able to solve straight line motion tasks. Student can define displacement, velocity and acceleration.							
LO2	Student knows and is able to solve circular motion tasks. Student can define angular quantities.							
LO3	Student knows and is able to solve Newtonian mechanics tasks. Student can define fundamental forces occurring in nature. Student knows what forces affect a solid body. Student knows how to write resultant force equations and how to solve them.							
LO4	Student knows and is able to solve rotational motion tasks. Student knows how to write a motion equation and solve it.							
LO5	Student knows and is able to define both energy and work in translational and rotational motion. Student knows how to solve tasks.							
LO6	Student knows and is able to define conservation of energy, conservation of momentum and conservation of angular momentum. Student knows how to solve tasks.							
LO7	Student knows and is able to define Archimedes principle. Student knows how to solve tasks.							
LO8	Student knows and is able to define the equation of continuity and Bernoulli's equation. Student knows how to solve tasks.							
LO9	Student knows and is able to define simple harmonic motion. Student can write damped and harmonic oscillation equation. Student knows how to define mathematical and physics pendulum. Student knows how to solve tasks.							
LO10	Student knows and is able to define damped and forced oscillation motion. Student can explain the resonance phenomenon. Student knows how to solve tasks.							
LO11	Student knows and is able to define the length, frequency and velocity of the wave. Student can write wave equation and knows what is wave interference. Student can define the Doppler's effect. Student knows how to solve tasks.							
LO12	Student knows and is able to define the fundamentals of thermodynamics. Student knows how to solve tasks.							
LO13	Student knows and is able to define electric field. Student can define Coulomb's force, force potential, work and capacitance. Student knows how charged particles interact. Student knows how to solve tasks.							
LO14	Student knows and is able to define magnetic field. Student know Lorentz's force. Student knows how to solve tasks.							
LO15	Student knows and is able to define Bohr's model of atom. Student can describe how laser works.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	2	EX1	2	LAB1	2		
LO2	LEC2	2	EX2	2	LAB2	2		
LO3	LEC3	2	EX3	2	LAB3	2		
LO4	LEC4	2	EX4	2	LAB4	2		
LO5	LEC5	2	EX5	2	LAB5	2		
LO6	LEC6	2	EX6	2	LAB6	2		
LO7	LEC7	2	EX7	2	LAB7	2		
LO8	LEC8	2	EX8	2	LAB8	2		
LO9	LEC9	2	EX9	2	LAB9	2		
LO10	LEC10	2	EX10	2	LAB10	2		
LO11	LEC11	2	EX11	1	LAB11	2		
LO12	LEC12	2			LAB12	2		

LO13	LEC13	2					
LO14	LEC14	2					
LO15	LEC15	2					
Total hours		30		21		24	0
SUBJECT MATTER CONTENT							
LEC1	Scalar and vector quantities in physics. Straight line motion, free fall motion, projectile motion. Equations for calculating displacement, velocity and acceleration.						
LEC2	Circular motion. Equations for calculating angle, angular velocity and angular acceleration. Definitions of period and frequency.						
LEC3	Newtonian mechanics. Newton's laws of motion for translational motion. Definition of momentum.						
LEC4	Newtonian mechanics. Newton's laws of motion for translational and rotational motion. Definition of angular momentum, inertia and torque.						
LEC5	Work, power and energy in translational and rotational motion.						
LEC6	Principles of conservation in physics. Conservation of energy, conservation of momentum and conservation of angular momentum.						
LEC7	Fluids. Definition of pressure, hydrostatic pressure, density, specific weight. Archimedes principle.						
LEC8	Equation of continuity and Bernoulli's equation.						
LEC9	Simple harmonic motion. Equations of displacement, velocity and acceleration. Equation for harmonic oscillations. Definitions of energy and restoring force. Mathematical and physical pendulum.						
LEC10	Damped and forced motion. Equation for damped and forced oscillations. The resonance phenomenon.						
LEC11	Wave. Definitions of length, frequency and velocity of wave. Wave interference and diffraction.						
LEC12	Thermodynamics. Ideal gas equation. Definitions of pressure, volume and temperature.						
LEC13	Electric field. Definition of Coulomb's force, force potential, work and capacitance. Electric displacement field. Charged particles interaction. Motion of charged particles in an electric field.						
LEC14	Magnetic field. Definition of Lorentz's force. Motion of charged particles in a magnetic field. Magnetic displacement field.						
LEC15	Bohr's model of atom. Fundamentals and terminology of lasers.						
EX1	Solving straight line motion and circular motion tasks.						
EX2	Solving free fall motion and projectile motion tasks.						
EX3	Solving Newtonian mechanics tasks. Designating friction.						
EX4	Solving translational and rotational motion tasks.						
EX5	Solving Archimedes principle and motion in fluids tasks.						
EX6	Solving equation of continuity and Bernoulli's equation tasks.						
EX7	Solving simple harmonic motion tasks.						
EX8	Solving damped and forced oscillations tasks. Designating the resonance frequency.						
EX9	Solving wave tasks.						
EX10	Solving electric field tasks.						
EX11	Written test.						
LAB1	Determination of rotational inertia of a rod.						
LAB2	Determination of density of solids.						
LAB3	Determination of cross section of an air particle.						
LAB4	Determination of glycerine viscosity using the Stokes methodology.						
LAB5	Determination of gravitational acceleration using a mathematical pendulum.						
LAB6	Determination of shear modulus.						

LAB7	Determination of sound velocity in air.								
LAB8	Determination of the factor in law of refraction in fluids and solids.								
LAB9	Determination of conductivity of electrolytes.								
LAB10	Determination of temperature factor of electrical resistance in metals.								
LAB11	Determination of electric displacement field in water.								
LAB12	Determination of Planck's constant.								
TEACHING AIDS									
1	Lecture with multimedia presentation.								
2	Blackboard and colour markers.								
3	Laboratory and its equipment.								
4	Science literature.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
S1	Theory written exam (LEC1 - LEC15).								
S2	Solving written calculation test (EX1 - EX11).								
S3	Submitting a laboratory report (LAB1 - LAB12).								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	45	30	0	0	0	0	75
<i>Lectures</i>			16	14					30
<i>Exercises</i>			16	5					21
<i>Laboratories</i>			13	11					24
<i>Simulator</i>									0
Student work:	0	0	45	30	0	0	0	0	75
<i>Preparation for classes</i>			45	30					75
TOTAL NUMBER OF HOURS	0	0	90	60	0	0	0	0	150
Number of ECTS points			3,5	3					6,5
LITERATURE									
Basic									
1	Halliday D., Resnick R., Walker J.: Fundamentals of Physics.								
Recommended									
1									
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Bartłomiej Kruszewski, b.kruszewski@amw.gdynia.pl								

B.I.7 Intellectual property copyright

Number of hours

Semester	Number of hours								Obligatory / selected	Requirements	ECTS points
				contact hours according to type							
	contact	preparation	total	lectures	exercises	laboratories	simulators	total			
0	0	0	0					0			
I	0	0	0					0			
II	0	0	0					0			
III	0	0	0					0			
IV	0	0	0					0			
V	0	0	0					0			
VI	15	15	30	5	10			15	O	Cg	1,5
VII	0	0	0					0			
Ogółem	15	15	30	5	10	0	0	15			1,5

Study contents

Intellectual property law asset. Invention, design patent, trademark, protected geographical indications, layout design (topographies) of integrated circuits, data base, work/composition. Intellectual property subjects, their rights and responsibilities. Fundamental assumptions and principles of intellectual property law. Freedom to administer intellectual property law assets: economic circulation, license agreement. Patent Office activities/tasks in the area of intellectual property protection. Work – private and property rights granted to its owner, owner’s responsibility, civil and penal law protection. Specific elements in copyright - computer programs, the Internet, database, image protection, correspondence protection. Information protection- basic assumptions and principles. Privacy law, personal data protection in digital society. Intellectual property protection in the information network environment. International jurisdiction and intellectual property law protection.

Learning outcomes

Legal status knowledge in the area of intellectual property law in Poland and European Union, comprehension of legal regulations and their practical applications in economic circulation in the area of intellectual property law administration, economic/market value of intellectual property objects, understanding the consequences of intellectual property law infringement.

3.1.2. Common major subjects

B.II.1 Navigation I

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Navigation I (O)							
2. Code of subject:	Qno							
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	I, II, III							
10. Profile:	Practical							
11. Lecturer:	PhD Eng. Karolina Zwolak + team							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	The acquaintance with geodesic basics of navigation.							
A2	The acquaintance with systems of supporting of navigation processes.							
A3	The acquaintance with basics of ship's dead reckoning and methods of terrestrial fixing.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Basic knowledge on physics.							
2	Basic knowledge on electronics, electrical engineering and automation.							
3	Basic knowledge on mathematics (trigonometry, vector analysis, differential and integral calculus).							
LEARNING OUTCOMES								
LO1	Student knows geodesic and navigational systems of references.							
LO2	Student knows horizontal directions and observer's basic lines and planes used in navigation.							
LO3	Student is familiarized with basic navigational, hydrographical and geographical terminology.							
LO4	Student knows and is able to use in navigation the buoyage system, the coastal aids to navigation and navigational bridge equipment.							
LO5	Student knows and is able to take into consideration the influence of hydro-meteorological conditions on ship's track.							
LO6	Student is able to determine the position of a ship with use of methods of terrestrial fixing.							
LO7	Student has knowledge on planning and using of nautical observations.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1-4	5			LAB1-2	4		
LO2	LEC5	1			LAB3	2		
LO3	LEC9	1						
LO4	LEC6-8, LEC10-20	23	EX1-7	15	LAB4-7	14		

LO5	LEC21-23	4	EX8-10	7			
LO6	LEC24-29	7			LAB8-10	9	
LO7	LEC30-31	2	EX11-12	3	LAB11	3	
Total hours		43		25		32	0

SUBJECT MATTER CONTENT

LEC1	Introduction to lectures (1).
LEC2	Navigational systems of references (2).
LEC3	Geographical systems of coordinates (1).
LAB1	Calculating the geographical coordinates and differences of coordinates (2).
LEC4	Traditional units of measure used in navigation (1).
LAB2	Converting the units of measure used in navigation (2).
LEC5	Directions on Earth's surface (1).
LAB3	Converting the horizontal directions expressed in different systems (2).
LEC6	Cartographic projection of nautical charts (1).
LEC7	Mercator projection (1).
LEC8	Principles of computation of geographical grid in Mercator projection (2).
LAB4	Computing the geographical grid in Mercator projection (4).
LEC9	Classification of sea areas (1).
LEC10	Navigational marks and their technical equipment (2).
LEC11	Characteristics of nautical lights (1).
EX1	Identification of nautical lights (2).
LEC12	IALA maritime buoyage system (2).
EX2	IALA buoyage identification (2).
LEC13	Nautical charts (2).
EX3	Reading a nautical chart (2).
LEC14	Thematic charts (1).
LEC15	Nautical publications (2).
EX4	Extracting information available in nautical publications (3).
LEC16	Principles of correction of nautical charts and other publications (2).
LAB5	Correcting the nautical charts and other publications (2).
LEC17	Finding the direction in navigation (2).
EX5	Converting the headings, bearings and relative bearings. Calculating the correction for magnetic compass reading (3).
LEC18	Finding the speed and the distance in navigation (2).
EX6	Calculating the speed and the distance covered by ship (1).
LEC19	Principles of a chartwork (1).
LAB6	Practical introduction to a chartwork (4).
LEC20	Dead reckoning and DR position (2).
LAB7	Plotting the courses and DR positions on chart (4).
EX7	Computational task (2).

LEC2 1	Ship's estimated position with leeway from wind (1).								
EX8	Applying the effect of wind to the ship's track (2).								
LEC2 2	Ship's estimated position with drift from sea current or tidal stream (2).								
EX9	Applying the effect of sea current or tidal stream to the ship's track (2).								
LEC2 3	Ship's estimated position with leeway and drift (1).								
EX10	Applying the effect of wind and sea current or tidal stream to the ship's track (3).								
LEC2 4	Parameters measured in navigation and their lines of position (1).								
LEC2 5	Nautical measurements on the ship's deck (1).								
LEC2 6	Fixing the ship (1).								
LEC2 7	A fix by observation of single beacon (1).								
LAB8	Plotting the ship's tracks with fixes from observation of single beacon (3).								
LEC2 8	A fix by observation of two beacons (1).								
LAB9	Plotting the ship's tracks with fixes from observations of two beacons (3).								
LEC2 9	A fix by observation of three beacons (2).								
LAB1 0	Plotting the ship's tracks with fixes from observations of three beacons (3).								
LEC3 0	A running fix (1).								
LAB1 1	Plotting a running fix on chart (3).								
LEC3 1	General principles of keeping the ship's Logbook (1).								
EX11	Keeping the ship's Logbook (1).								
EX12	Exercise on nautical chart (2).								
TEACHING AIDS									
1	Notebook and multimedia projector.								
2	Folios projector.								
3	Whiteboard and colour felt-tips.								
4	Nautical charts, triangles and dividers.								
5	Nautical publications.								
6	Pocket calculators.								
7	Laboratory of navigation.								
8	RADAR/ARPA-ECDIS/WECDIS Simulator.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Written personal reports from laboratory tasks and exercises (LAB1 - LAB8, LAB10 - LAB11).								
S1	Computational task (LO1 - LO4).								
F2	Written personal reports from laboratory tasks and exercises on charts (LAB13 - LAB21).								
S2	Comprehensive exercise on chart (LO5 - LO7).								
S3	Final exam on navigation (theoretical questions, nautical calculations and comprehensive task on nautical chart).								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	

Contact hours:	0	20	45	35	0	0	0	0	100
<i>Lectures</i>		10	20	13					43
<i>Exercises</i>			15	10					25
<i>Laboratories</i>		10	10	12					32
<i>Simulator</i>									0
Student work:	0	20	45	35	0	0	0	0	100
<i>Preparation for classes</i>		20	45	35					100
TOTAL NUMBER OF HOURS	0	40	90	70	0	0	0	0	200
Number of ECTS points		2	3,5	3					8,5
LITERATURE									
Basic									
1	Bowditch N.: The American Practical Navigator. National Imagery And Mapping Agency, Bethesda (<i>obsolete editions accessible also on Internet.</i>)								
2	Admiralty Manual Of Navigation, Vol.1. The Stationery Office (TSO), London (<i>obsolete editions accessible also on Internet.</i>)								
Recommended									
1	Urbański J., Kopacz Z., Posiła J.: Nawigacja morska, cz I i II, Wydawnictwo AMW, Gdynia 1996.								
2	Żołnieruk D.: Nakres drogi okrętu, cz. I. Wydawnictwo AMW, Gdynia 2016.								
3	Dąbrowski T., Czaplewski K.: Locja Morska, Wydawnictwo AMW, Gdynia 1998.								
4	Wróbel F.: Vademecum Nawigatora, TradeMar, Gdynia 2007.								
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Karolina Zwolak, k.zwolak@amw.gdynia.pl								
2	Tadeusz Dąbrowski, tadeusz-43@wp.pl								
3	Piotr Zwolan, p.zwolan@amw.gdynia.pl								
4	Arkadiusz Narloch, a.narloch@amw.gdynia.pl								
5	Sławomir Świerczyński, s.swierczynski@amw.gdynia.pl								
6	Łukasz Marchel, l.marchel@amw.gdynia.pl								

B.II.2 Meteorology & oceanography

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Meteorology & oceanography (O)							
2. Code of subject:								
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	II, III							
10. Profile:	Practical							
11. Lecturer:	PhD Eng. Czesław Dyrzcz							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	The acquaintance with understanding and interpreting a synoptic chart.							
A2	Learning of knowledge how to forecast weather, taking into account local weather conditions and information received by weather fax or another on-board equipment.							
A3	The acquaintance with characteristics of various weather systems, including tropical revolving storms and avoidance of storm centres and the dangerous quadrants.							
A3	The acquaintance with ocean currents and phenomime of sea ice.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Basic knowledge on physics.							
2	Basic knowledge on electronics, electrical engineering and automation.							
3	Basic knowledge on mathematics (trigonometry, vector analysis, differential and integral calculus).							
LEARNING OUTCOMES								
LO1	Student knows the characteristics of various weather systems, including tropical revolving storms and avoidance of storm centres and the dangerous quadrants.							
LO2	Student can understand and interpret synoptic charts.							
LO3	Student is familiarized with basic meteorology and oceanography terminology.							
LO4	Student knows and is able to apply relevant international regulations, codes and standards concerning the safe voyage according to weather conditions.							
LO5	Student knows and is able to take into consideration the influence of hydrometeorological conditions on ship's track.							
LO6	Student has knowledge on hydrometeorological observations.							
LO7	Student can use of all appropriate meteorological and oceanographical publications.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1, LEC2, LEC6	3			LAB1	1		
LO2	LEC3, LEC5	2			LAB1	1		

LO3	LEC4, LEC9	3			LAB1	1	
LO4	LEC7,8,10-15	9			LAB1, LAB2	2	
LO5							
LO6	LEC16-17, LEC22	3	EX1, EX2	7	LAB3, LAB5	3	
LO7	LEC18-21	5			LAB4	2	
Total hours		25		7		10	0
SUBJECT MATTER CONTENT							
LEC 1	Weather elements observed and measured (1).						
LEC 2	Air temperature (1).						
LEC 3	Air humidity (1).						
LAB 1	Analysis of synoptic charts (4).						
LEC 4	The balance of the atmosphere (2).						
LEC 5	Types of clouds (1).						
LEC 6	The precipitation (1).						
LEC 7	Fog and haze (1).						
LEC 8	Visibility (1).						
LEC 9	The atmospheric pressure (1).						
LEC 10	Winds on the globe, local winds, cyclones (2).						
LEC 11	The general circulation of the atmosphere (1).						
LEC 12	Lows, highs and barycenter fronts (1).						
LEC 13	Analysis of synoptic charts (1).						
LEC 14	The reception and interpretation of weather information on the ship (1).						
LEC 15	Ship meteorological device. Conduct measurements and meteorological observations (1).						
LAB 2	Interpretation of weather information on the ship (1).						
LAB 3	Filling in the logbook and log meteorological observation, key SHIP (1).						
LEC 16	Ship meteorological device. Conduct measurements and meteorological observations (1).						
EX1	Summary (4).						
LEC 17	Filling in the logbook and log meteorological observation, key SHIP (1).						
LEC 18	Introduction to Meteorology and Oceanography (Part 2 – Oceanography) (1).						
LEC 19	Wavy wind theories, development and disappearance (1). Effect of wave on the movement of the ship (1).						
LEC 20	Ocean currents – classification, prevalence, characteristics (1).						

LEC 21	The phenomenon of ice on the high seas (2).									
LEC 22	Impact of the seabed and coastline to the phenomenon of tidal currents (1).									
LAB 4	The phenomenon of ice on the high seas. Analysis of ice charts (2).									
LAB 5	The phenomenon of ice on the high seas. Icing nomograms (2).									
EX2	Summary (3).									
TEACHING AIDS										
1	Notebook and multimedia projector.									
2	Whiteboard and colour felt-tips.									
3	Synoptic and ice charts.									
4	Triangles and dividers.									
5	Nautical and meteorological publications.									
6	Pocket calculators.									
7	Laboratory of meteorology and oceanography METOC.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
F1	Written personal reports from laboratory tasks and exercises (LAB1 - LAB3).									
S1	Computational task (LO1 - LO4).									
F2	Written personal reports from laboratory tasks and exercises (LAB4, LAB5).									
S2	Comprehensive exercise on METOC charts (LO1 - LO7).									
S3	Final test on Meteorology and oceanography (theoretical questions, meteorological calculations and task on synoptic chart) (LO1 - LO7).									
STUDENT WORKLOAD										
Form of activity	Number of hours per semester									Total
	0	I	II	III	IV	V	VI	VII		
Contact hours:	0	0	22	20	0	0	0	0	0	42
<i>Lectures</i>			17	8						25
<i>Exercises</i>				7						7
<i>Laboratories</i>			5	5						10
<i>Simulator</i>										0
Student work:	0	0	22	20	0	0	0	0	0	42
<i>Preparation for classes</i>			22	20						42
TOTAL NUMBER OF HOURS	0	0	44	40	0	0	0	0	0	84
Number of ECTS points			2	1,5						3,5
LITERATURE										
Basic										
1	Dyrcz C.: <i>Meteorology and Oceanography. Terms, definition and explanations</i> , AMW, Gdynia 2017.									
2	Bowditch N.: <i>The American Practical Navigator</i> , National Imagery And Mapping Agency.									
Recommended										
1	Trzeciak S.: <i>Meteorologia morska z oceanografią</i> , Wydawnictwo Naukowe PWN, Warszawa 2016.									
2	Holec M., Tzymański P.: <i>Podstawy meteorologii i nawigacji meteorologicznej</i> , Wydawnictwo Morskie, Gdańsk 1973.									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Czesław Dyrcz, c.dyrcz@amw.gdynia.pl									

B.II.3 Maritime communication

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Maritime communication (O)							
2. Code of subject:	QIs							
3. Department:	Laboratory of Maritime Communication and Radiolocation							
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	III							
10. Profile:	Practical							
11. Lecturer:	MSc Eng. Artur Szczepański, MSc Eng. Jacek Zalewski							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	To familiarize students with the general information relating to light and sound signalling by International Code of Signals.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1								
LEARNING OUTCOMES								
LO1	The student has knowledge of signalling using the International Code of Signals.							
LO2	The student is able to transmit and receive signals using any means of signalling, in accordance with its technical capabilities. He can use a document defining the rules of traffic at sea.							
LO3	The student has knowledge of reporting systems.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes – exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1, LEC2	2			LAB1, LAB2	3		
LO2	LEC3-5	6			LAB3	2		
LO3	LEC6	2	EX1	1				
Total hours		10		1		5		0
SUBJECT MATTER CONTENT								
LEC1	International Code of Signals - signalling flags, use signals letters, medical communications (1).							
LEC2	Receiving and transmitting Morse code light signals and light signalling of individual letters and characters according to ICS (1).							

LEC3	Distress communications in the VHF, MF and HF band (2).									
LEC4	Ensure safety and urgent communications in the VHF, MF and HF (2).									
LEC5	Transmission of marine safety information - MSI. Receiving MSI using: NAVTEX, EGC SafetyNET, HF NBDP (2).									
LEC6	Reporting systems.									
LAB1	International Code of Signals - signalling flags, use signals letters. Medical Communications - the use of ICS (1).									
LAB2	Receiving and transmitting Morse code light signals and light signalling of individual letters and characters according to ICS (2).									
LAB3	Transmission systems of marine safety information - MSI. Receiving MSI using systems: NAVTEX, EGC SafetyNET, HF NBDP (2).									
Ex1	Test (1).									
TEACHING AIDS										
1	Lecture with multimedia presentation.									
2	Signalling simulator.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
S1	Test.									
STUDENT WORKLOAD										
Form of activity		Number of hours per semester							Total	
		0	I	II	III	IV	V	VI		VII
Contact hours:		0	0	16	0	0	0	0	0	16
<i>Lectures</i>				10						10
<i>Exercises</i>				1						1
<i>Laboratories</i>				5						5
<i>Simulator</i>										0
Student work:		0	0	16	0	0	0	0	0	16
<i>Preparation for classes</i>				16						16
TOTAL NUMBER OF HOURS		0	0	32	0	0	0	0	0	32
Number of ECTS points				1,5						1,5
LITERATURE										
Basic										
1	International Code of Signals. Version 2005.									
Recommended										
1										
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Artur Szczepański, a.szczepanski@amw.gdynia.pl									
2	Jacek Zalewski, j.zalewski@amw.gdynia.pl									

B.II.4 Astronavigation

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Astronavigation (O)
2. Code of subject:	Qna
3. Department:	
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	III, IV
10. Profile:	Practical
11. Lecturer:	MSc Dariusz Żołnieruk
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	The acquaintance with astronomical basics of astronavigation.
A2	The acquaintance with principles of using marine chronometer.
A3	The acquaintance with principles of using sextant in navigation.
A4	The acquaintance with principles of using The Nautical Almanac and other thematic publications.
A5	The acquaintance with principles of finding and identifying navigational stars and planets.
A6	The acquaintance with principles of obtaining astronomical line of position.
A7	The acquaintance with principles of obtaining ship's latitude by meridian altitude of celestial body.
A8	The acquaintance with principles of obtaining ship's latitude by altitude of Polaris.
A9	The acquaintance with principles of astronomical running fix by two consecutive sights.
A10	The acquaintance with principles of astronomical fix by two or more simultaneous sights.
A11	The acquaintance with principles of astronomical method of compass error determination.
A12	The acquaintance with accuracy of astronomical measurements, lines of position, fixes and other calculations in astronavigation.
A13	The acquaintance with principles of planning celestial sights during navigational watch.
A14	The acquaintance with basic problems of spherical trigonometry.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Basic knowledge on navigation.
2	Basic knowledge on electronics, electrical engineering and automation.
3	Basic knowledge on mathematics (specifically trigonometry).
LEARNING OUTCOMES	
LO1	Student knows astronomical basics of astronavigation.
LO2	Student knows equatorial and horizontal systems of coordinates.
LO3	Student is familiarized with elements of general astronomy.
LO4	Student knows types of time scales used in navigation.
LO5	Student knows principles of using marine chronometer.
LO6	Student knows principles of using sextant in navigation.

LO7	Student can determine the equatorial coordinates of celestial bodies and moments of astronomical phenomena with use of The Nautical Almanac.							
LO8	Student can find and identify navigational stars and planets with use of Star Finder and Identifier.							
LO9	Student is familiarized with other nautical publications used in astronavigation.							
LO10	Student knows how to obtain the elements of astronomical line of position and plot it on chart.							
LO11	Student knows how to obtain ship's latitude by meridian altitude of celestial body and plot it on chart.							
LO12	Student knows how to obtain ship's latitude by altitude of Polaris and plot it on chart.							
LO13	Student knows how to obtain astronomical running fix by two consecutive sights and plot it on chart.							
LO14	Student knows how to obtain astronomical fix by two or more simultaneous sights and plot it on chart.							
LO15	Student knows how to determine compass error by astronomical sight.							
LO16	Student is familiarized with accuracy of astronomical measurements, lines of position, fixes and other calculations in astronavigation.							
LO17	Student has knowledge on planning celestial sights during navigational watch.							
LO18	Student is familiarized with use of basic formulas of spherical trigonometry.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1-3	3						
LO2	LEC4	2	EX1	1	LAB1	1		
LO3	LEC5	2	EX2	1	LAB2	2		
LO4	LEC6	3	EX3	2				
LO5	LEC7	2	EX4	1	LAB3	1		
LO6	LEC8	2	EX5	1	LAB4	3		
LO7	LEC9	2	EX6	3				
LO8	LEC10	2	EX7	2				
LO9	LEC11	1	EX11	2				
LO10	LEC15	3	EX12	6				
LO11	LEC16	1	EX13	1				
LO12	LEC17	1	EX14	1				
LO13	LEC18	2	EX15	4				
LO14	LEC19	2	EX16	4				
LO15	LEC20	2	EX17	2				
LO16					LAB5	2		
LO17	LEC21	1	EX18	1				
LO18	LEC12-14	4	EX8-10	8				
Total hours		35		40		9		0
SUBJECT MATTER CONTENT								
LEC1	Introduction to lectures (1).							
LEC2	Nautical measurements in astronavigation (1).							
LEC3	Celestial sphere and its elements (1).							
LEC4	Celestial systems of coordinates used in astronavigation (2).							
EX1	Graphical transformation of celestial coordinates (1).							
LAB1	Celestial systems of coordinates - live presentation in planetarium (1).							

LEC5	Elements of general astronomy (2).
LAB2	Elements of general astronomy - live presentation in planetarium (2).
EX2	Written test (1).
LEC6	Time in astronavigation (3).
EX3	Time in astronavigation - basic calculations (2).
LEC7	Marine chronometer (2).
EX4	Marine chronometer - determining UTC for the moment of sight (1).
LAB3	Daily maintenance of marine chronometer (1).
LEC8	Sextant (2).
EX5	Principles of using sextant in navigation (1).
LAB4	Celestial and terrestrial measurements with use of sextant - training in planetarium (3).
LEC9	The Nautical Almanac (2).
EX6	Determining the equatorial coordinates of celestial bodies and moments of astronomical phenomena with use of The Nautical Almanac (3).
LEC1 0	Star finders (2).
EX7	Finding and identifying navigational stars and planets with use of Star Finder and Identifier NP 323 (2).
LEC1 1	Other nautical publications used in astronavigation (1).
LEC1 2	Spherical triangle (1).
EX8	Spherical triangle - tutorial (1).
LEC1 3	Basic formulas in spherical trigonometry (2).
EX9	Basic formulas in spherical trigonometry - tutorial (6).
LEC1 4	Rectangular spherical triangle (1).
EX10	Rectangular spherical triangle - tutorial (1).
EX11	Computational task (2).
LEC1 5	Astronomical line of position (3).
EX12	Correcting the sextant altitude and computing the azimuth and altitude for assumed position. Calculating and plotting on chart the elements of astronomical line of position (6).
LEC1 6	Latitude by meridian altitude of celestial body (1).
EX13	Calculating and plotting on chart the latitude by meridian altitude (1).
LEC1 7	Latitude by altitude of Polaris (1).
EX14	Calculating and plotting on chart the latitude by altitude of Polaris (1).
LEC1 8	Astronomical running fix by two lines of position (2).
EX15	Plotting an astronomical running fix on chart (4).
LEC1 9	Astronomical fix by simultaneous sights of two or more celestial bodies (2).
EX16	Plotting an astronomical fix on chart (4).
LEC2 0	Astronomical method of determination of compass error (2).
EX17	Calculating the compass error by azimuth of celestial body (2).
LEC2 1	Planning of astronomical sights during navigational watch (1).
EX18	Planning of astronomical sights with use of Star Finder and Identifier (NP 323) or any astronomical planetarium-type application (1).

LAB5	Exercise on nautical chart (2).									
TEACHING AIDS										
1	Notebook and multimedia projector.									
2	Folios projector.									
3	Whiteboard and colour felt-tips.									
4	The Nautical Almanac.									
5	Star Finder and Identifier (NP 323).									
6	Pocket calculators.									
7	Nautical charts, triangles and dividers.									
8	Planetarium.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
S1	Written test (LO1 - LO3).									
S2	Computational task (LO4 - LO9).									
S3	Comprehensive exercise on chart (LO10 - LO18).									
STUDENT WORKLOAD										
Form of activity		Number of hours per semester							Total	
		0	I	II	III	IV	V	VI		VII
Contact hours:		0	0	0	42	42	0	0	0	84
Lectures					22	13				35
Exercises					13	27				40
Laboratories					7	2				9
Simulator										0
Student work:		0	0	0	42	42	0	0	0	84
Preparation for classes					42	42				84
TOTAL NUMBER OF HOURS		0	0	0	84	84	0	0	0	168
Number of ECTS points					3,5	3,5				7
LITERATURE										
Basic										
1	Bowditch N.: The American Practical Navigator. National Imagery And Mapping Agency, Bethesda (<i>obsolete editions accessible also on Internet</i>).									
2	Admiralty Manual Of Navigation, Vol.2. The Stationery Office (TSO), London.									
3	Farley R. E.: Celestial Navigation in a Teacup. Teacup Navigation Publishing, 2011. e-Book at http://mysite.verizon.net/milkyway99/id1.html									
4	Jaaback H.: Celestial Navigation for Deck Officers and for Yachtmasters, Part 1. Yachtmaster Ocean Service, Cape Town 1999.									
5	Karl J. H.: Celestial Navigation in the GPS Age. Paradise Cay Publications / Celestaire, Arcata / Wichita 2007.									
6	Umland H.: A short guide to celestial navigation. Henning Umland, Buchholz in der Nordheide 2006.									
7	Nautical Almanac Commercial Edition. Paradise Cay Publications, Arcata (any edition).									
8	The Nautical Almanac. Her Majesty's Nautical Almanac Office/The United Kingdom Hydrographic Office. Taunton (any edition).									
Recommended										
1	Żołnieruk D.: Astronawigacja cz. 1. Wydawnictwo Akademickie AMW, Gdynia 2008.									
2	Żołnieruk D.: Astronawigacja cz. 2. Wydawnictwo Akademickie AMW, Gdynia 2014.									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Dariusz Żołnieruk, d.zolnieruk@amw.gdynia.pl									

B.II.5 Navigation II + ECDIS

Number of hours

Semester	Number of hours								Obligatory / selected	Requirements	ECTS points
				contact hours according to type							
	contact	preparation	total	lectures	exercises	laboratories	simulators	total			
0	0	0	0					0			
I	0	0	0					0			
II	0	0	0					0			
III	46	46	92	10	36			46	O	Cg	4
IV	59	59	118	13	26	10	10	59	O	E	5
V	0	0	0					0			
VI	0	0	0					0			
VII	0	0	0					0			
Ogółem	105	105	210	23	62	10	10	105			9

Study contents

The acquaintance with geodesic basics of navigation. The acquaintance with systems of supporting of navigation processes. The acquaintance with basics of calculations of the sailings. The acquaintance with basics theory of tides. The acquaintance with rules keeping a navigational watch - watchkeeping procedures. The acquaintance with navigational errors.

Learning outcomes

After completing the course a student possesses knowledge on geodesic basics of navigation, watchkeeping procedures, emergency procedures, systems of supporting of navigation processes, calculations of the sailings, basics theory of tides and navigational errors.

B.II.6 Navigation instruments + ARPA

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Navigation instruments + ARPA (O)
2. Code of subject:	Qnv
3. Department:	
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	III, IV
10. Profile:	Practical
11. Lecturer:	Prof. Andrzej Felski, PhD Eng. Krzysztof Jaskólski
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	The character, nature and destination of ship's navigation instruments.
A2	Magnetic compasses, gyrocompasses and satellite compasses.
A3	Ship's logs.
A4	Echosounders.
A5	Different aspects of the automatization of the navigation: autopilot, AIS, VDR and transmission of navigation information.
A6	Inertial Navigation Systems and new gyro-solutions.
A7	Radionavigation and GNSS.
A8	Radar / ARPA systems.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Basic knowledge of physics, electronics and automation.
2	Basic knowledge on mathematic including the trigonometry, vector and integral analysis.
3	The credit of Navigation I.
LEARNING OUTCOMES	
LO1	Understanding the general principles of using electronic navigation instruments and evaluate the information in correct way.
LO2	Knowledge of influences of the magnetic field of Earth and the ship on the compass.
LO3	Ability to determine errors of magnetic compass and to perform the table of deviation.
LO4	Knowledge of principles and the exploitation of fluxgate compasses.
LO5	Knowledge of principles, classification and the exploitation of logs.
LO6	Ability to determine errors of logs.
LO7	Knowledge of principles, classification and the exploitation of echosounders.
LO8	Knowledge of principles of gyrocompasses, its operational properties and character of errors.
LO9	Knowledge of regularities and typical solutions of the automatization in the field of navigation.
LO10	Knowledge of AIS, LRIT and VDR.
LO11	Knowledge of NMEA 0183 and 2000 standards and ability to use this in practice.

LO1 2	Knowledge of principles of autopilot, its control functions and ability to use this in practice.
LO1 3	Knowledge of radionavigation systems and ability to determine position of the ship, as well as evaluate quality of information.
LO1 4	Ability to use GNSS receivers.
LO1 5	Knowledge of Land Based Radionavigation Systems.
LO1 6	Knowledge of tendency in gyroscopic and inertial technique.
LO1 7	Knowledge of principles of exploitation of Inertial Navigation Systems.
LO1 8	Knowledge of principles of exploitation navigational devices; elements of the theory of the technical reliability.
LO1 9	Knowledge of principles of operation and use as well as errors and limitations of radar/ARPA systems.

STRUCTURE OF SUBJECT

	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	1						
LO2	LEC2-4	4			LAB1	1		
LO3	LEC5	1			LAB2	2		
LO4								
LO5	LEC7-8	2						
LO6	LEC6, LEC9	2	EX1	1	LAB3, LAB4	3		
LO7	LEC10	2			LAB5	2		
LO8	LEC11-15	9			LAB6-9	7		
LO9	LEC16	2						
LO10	LEC17, LEC18	4			LAB10	2		
LO11					LAB11	2		
LO12	LEC19	2	EX2	2	LAB12	2		
LO13	LEC20-23	10			LAB13	2		
LO14					LAB14, LAB15	4		
LO15	LEC24-27	6			LAB16, LAB17	2		
LO16	LEC28	1						
LO17	LEC29	4			LAB18	1		
LO18	LEC30	2	EX3	2				
LO19	LEC31, LEC32	10	EX4	1	LAB19-21	10		
Total hours		62		6		40		0

SUBJECT MATTER CONTENT

LEC 1	The introduction to navigational systems. Measuring, executive and visualisation systems. The notion of the measurement's error, kinds of errors, manner of error's expression. The joining and the integration of devices. Physical phenomena used in navigational measurement, sizes and the value.
LEC 2	Earth magnetism, the source, character and the manner of description. The variability (spatial and temporal), variation.
LEC 3	The magnetism of the ship, the source and their classification, steel types, the influence on the compass, Archibald Smitha equation, Poisson equation,
LEC 4	The construction of the classical magnetic compass and its exploitation, the location of the compass aboard and requirements of IMO and classificatory companionships.

LAB 1	The use of the magnetic compass, taking of bearings.
LEC 5	Finding the deviation, adjustment procedures.
LAB 2	Practical finding the deviation in the bridge simulator.
LEC 6	The construction of the fluxgate compass (the measuring-gate, transducer, anisotropic magneto-resistor).
LAB 3	The analysis of the construction and rules of the service of the example - fluxgate compass. The analysis of the construction and rules of the service of the example - fluxgate compass.
LEC 7	The problem of the speed of the ship, the relative velocity and real. Methods of the measurement, used physical phenomena, the classification of logs.
LEC 8	The construction, exploitive limitations, compensators and regulators, the accuracy of logs (hydrodynamic, electromagnetic, Doppler).
LEC 9	The exploitation and service of the log, error determination.
LAB 4	Determination of the log errors in the bridge simulator.
EX1	Written test (1).
LEC 10	The construction and principles of the navigational echo sounder. The general schema, the transducers, the beam characteristic, manners of result's presentation. The sonars and multibeam echosounders.
LAB 5	The use of the echosounder SKIPPER; Requirements IMO for the echosounder.
LEC 11	The nature of the mechanical gyroscope, basic properties, the precession. The comportment of the free gyroscope on earth, the movement of the meridian and the horizon.
LAB 6	The settlement of gyroscope direction of precession.
LEC 12	The transformation of the free gyroscope into the gyrocompass. The meaning of the decrease of the centre of gravity, the description of the process of placing itself in the meridian, undamped and damped oscillations, the Anshutz method.
LAB 7	The analysis of the behaviour of the gyroscopic element with the lowered centre of gravity.
LEC 13	Kinds and reasons of the of the gyrocompass errors. The speed error, ballistic deflection.
LAB 8	Speed error calculation.
LEC 14	The construction of the standard gyrocompass. The construction of the gyrosphere, the power supply and the suspension of the gyrosphere, the tracking of the position of the gyrosphere, heading transmission, quality of electrolyte, cooling and other exploitive problems. Requirements IMO for the gyrocompass.
LAB 9	Typical construction of gyrocompass analysis; familiarization with gyrocompass.
LEC 15	The construction and principles of the gyrocompass with the external correction.
LEC 16	Basics of the automatization of the navigation. The automatization of devices, the processes (dead-reckoning, the stabilization of the heading, position fixing), integration (OMB, e-Navigation).
LEC 17	Practical aspects of the automatization of navigational devices. The data transmission standards, Voyage Data Recorder, Integrated Bridge System, One Man Bridge, Integrated Navigation System and Bridge Alarms Management System, versatile monitors.
LEC 18	Automatic Identification System, Long Rang Identification System.
LAB 10	The practical use of AIS, basic operator's acts.
LAB 11	Navigational Data monitoring in the NMEA standard.

LEC 19	The automatic steering of the ship's heading. The nature of the steering process, the outline of history of the automatic pilot, the proportional, differentiating and integrating elements. The adaptive automatic pilot. Autopilot's control.
LAB 12	Operating autopilot and autopilot's controls.
EX2	Written test (2).
LEC 20	Basics information about the use of the radio-technique in navigation. Parameters of the radio wave, the propagation, patterns and scales of the time in radionavigation systems, line of position, classification of the systems.
LEC 21	The movement of the artificial satellite in the earth gravity field, the description of the orbit, coordinates.
LEC 22	Satellite system GPS - the construction, mechanism of action, accuracy, the comparison with GLONASS and Galileo systems.
LEC 23	Differential versions of GNSS (DGPS, EGNOS). The satellite compass.
LAB 13	Operating GPS/DGPS/EGNOS receiver.
LAB 14	Control of the position accuracy, signal quality, regulations, the set-up the WayPoints and the programming of the route and alarms.
LAB 15	Familiarization with the satellite compass, the interpretation of indications.
LEC 24	Radionavigation pilotage and short-range systems; the construction, mechanism of action, the accuracy.
LEC 25	Radio-direction finding.
LAB 16	Finding radio-direction.
LEC 26	Basics of hyperbolic Radionavigation Systems.
LEC 27	Loran C - the construction, mechanism of action, coverage, accuracy, corrections, NELS, Eurofix, e-Loran.
LAB 17	The use of Loran-C receiver.
LEC 28	Direction of gyroscopic technology development, analytic gyrocompasses.
LEC 29	Inertial Navigational Systems, Dynamic Positioning Systems.
LAB 18	Analysis of exploitative properties of INS.
LEC 30	Principles of exploitation of the navigation devices.
EX3	Written test (2).
LEC 31	Basic radiolocation phenomena and problems (6).
LEC 32	Principles of safe operation of radar equipment (4).
LAB 19	Radar support, interpretation and analysis of information received from the radar (3).
LAB 20	Main types of ARPA, types of data presentation, the risk of bestowing indications with excessive confidence (2).
LAB 21	Acquisition, interpretation and analysis of information from ARPA (5).
EX4	Written test (1).
TEACHING AIDS	
1	Notebook and multimedia projector.
2	Folios projector.

3	Whiteboard and colour felt-tips.								
4	Nautical publications.								
5	Electronic navigation instruments.								
6	Bridge simulator.								
7	Manuals for concerned navigation instruments.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Written personal reports from laboratory tasks and exercises (LAB1-21).								
S1 - S4	Written test.								
S5	Final exam.								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	44	44	0	0	0	0	88
<i>Lectures</i>			26	26					52
<i>Exercises</i>			2	4					6
<i>Laboratories</i>			16	14					30
<i>Simulator</i>									0
Student work:	0	0	44	44	0	0	0	0	88
<i>Preparation for classes</i>			44	44					88
TOTAL NUMBER OF HOURS	0	0	88	88	0	0	0	0	176
Number of ECTS points			3	3,5					6,5
LITERATURE									
Basic									
1	Notes of professor / pdf presentations.								
2	The American Practical Navigator. National Imaginery and Mapping Agency, Bethesda, 2013.								
3	Admiralty Manual of Navigation (BR45) vol. 1 and 3. London, 2014.								
4	Bekir E.: Introduction to Modern Navigation Systems. World Scientific Publishing Co. London, 2007.								
5	Tetley L., Calcutt D.: Electronic Navigation Systems. Butterworth-Heinmann Publ., Oxford, 2001.								
6	Felski A., Jaskólski K.: Navigational instruments-collection of guides for laboratory classes.								
Recommended									
1	SOLAS Convention.								
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Andrzej Felski, a.felski@amw.gdynia.pl								
2	Krzysztof Jaskólski, k.jaskolski@amw.gdynia.pl								

B.II.7 Ship structure and stability

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Ship structure and stability (O)
2. Code of subject:	Qws
3. Department:	
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	IV, V, VI
10. Profile:	Practical
11. Lecturer:	Prof. Assoc. Waldemar Mironiuk
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	Acquainting students to the basic concepts of ship's buoyancy and the hull's geometry.
A2	Developing the ability to make calculations: displacement, coordinates of the center of mass, changes in displacement and the coordinates of the center of mass while moving, adding and removing of cargo on board and changing the density of water. Developing the ability of using the ship stability documentation.
A3	Acquaint students with the activity of Classification Societies and basic operating characteristics of ships.
A4	Acquaint students with the basic terms of the initial stability and manufacturing skills of calculation: the transverse and longitudinal metacentric height, trim, heeling and bow and stern draughts of the ship loading operations.
A5	Acquaint students with the concept of the free surface effect. Acquaint students with the effect of a freely suspended weight.
A6	Acquaint students with the basic terms ship stability at large angles of heel and manufacturing skills of preparing the righting lever curve and evaluate its course by the stability criteria.
A7	Acquaint students with hull's internal bonds and nomenclature of individual structural elements of the hull. Familiarization with the basic documentation of hull structure.
A8	Acquaint students with behaviour of the ship during the static rolls. Developing the ability of calculation statically heeling moments and determining the static angle of heel on the righting lever curve and its correction due to free surfaces of liquids. Acquaint students with the principles of performance and analyze results inclining test.
A9	Acquaint students with behaviour of the ship during the dynamic rolls. Developing the ability to: preparation of the dynamic stability curve, making the calculation of the heeling dynamically from the wind, the determination of the dynamic angle of heel and verification weather criterion.
A10	Acquaint students with the stability criteria according to IMO regulations. Manufacturing skills validation of criteria in ship operation.
A11	Acquaint students with the basics of the overall strength of the hull. Manufacturing skills to determine and verify the overall strength of the hull during ship operation.
A12	Acquaint students with the basic methods of determining the damage stability and manufacturing skills of checking the stability criteria for the different states of ship operation.

A13	Acquaint students with the principles of using scaling tables of tanks and cargo holds. Manufacturing skills determine the loaded weight based on the measurement of drafts and familiarization with the principles of the planning load condition.
A14	Acquaint students with the phenomena associated ship's rolling, ways to rolling prevent and methods of avoiding resonance oscillation.
A15	Acquaint students with basic hull's equipment and types of steering gear and propellers.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Knowledge of physics at the high school level.
2	Knowledge of mathematics, physics at the high school level.
3	Basic knowledge of a technical drawing.
LEARNING OUTCOMES	
LO1	The student knows the system axis and a plane associated with the hull. He knows the rules for creating a body line, theoretical determination of the main dimensions and calculating the coefficients of form. He knows the concepts of buoyancy, displacement, center of buoyancy, the weight of the vessel, the center of mass of the ship, volume of displacement. Understand the equation of balance of the ship.
LO2	The student knows methods for calculating the displacement and coordinates of the center of mass of the ship. He can determine the buoyancy and the coordinates of the center of mass of the ship by the table of the masses. He knows ship stability documentation: Bonjean's scale, hydrostatic curves, Firsow's graph, loaded scale. He can use the file of the ship to determine the selected parameters hydrostatic hull. He can determine changes in displacement and the coordinates of the center of mass of the ship after the adding, moving cargo on the ship. Understand the impact of water density on draft. Using documentation he can determine the draft of the ship in water of different densities.
LO3	The student knows the scope of activities of Classification Societies. He knows the concept of class ship, and understands the purpose of the creation of the classification requirements in the regulations of construction and operation of ships. He knows the division of ships due to their use, the type of the plants, propulsion type and material of the hull. Knows basic characteristics and operational parameters describing the ship and the general plans, plans tanks and construction of different types of ships. He knows the signs marking the hull freeboard and registered Draughts and the purpose of their use in ship operation.
LO4	The student knows the basic concepts of the initial transverse stability: metacenter, metacentric radius, metacentric height, righting moment, heeling moment. He knows the states of the balance of the ship. He knows the basic concepts of longitudinal stability: longitudinal metacentric height, longitudinal angle, trim of the ship, individual trimming moment. He knows the method for calculating the metacentric height. He can calculate the metacentric height, trim, angle of trim, bow and stern draught during ship operation. He can calculate the angle of heel in the range of initial stability. He can determine changes heel, trim and Draughts during the operation of the cargo and ballast tanks.
LO5	The student understands the concept of the free surface of the liquid and the principle of changing the position of the liquid from the free surfaces in the hull during the roll of the ship. He can calculate the corrected height of the center of mass and improved metacentric height of the ship.
LO6	The student knows the basic concepts of stability at large angles of heel: the stability of the shape and stability of the weight. Understands the principle of determining the righting lever. He knows the stability criteria for the righting lever curve. He can interpret the interdependence of the righting lever curve to the initial metacentric height.
LO7	The student understands the ship's static heeling moments. He can determine the static angle of heel from the righting lever curve using ship stability documentation. The student knows the rules for the inclining test of the vessel and he is able to analyze test results according to the rules of a classification society.
LO8	The student knows the materials used in the construction of the hull, the basic mechanical characteristics, fields of application and connected technologies. He knows the basic bond hull and their distribution. He knows the structure of the hull in the area of the bottom, sides, deck, bow, stern, and ship's equipment. He knows the structural elements of the bulkhead. He knows the concept of scantling hull.

LO9	The student understands the ship's dynamic heeling moments. He understands the concept of dynamic lever. He knows the rules for determining the area under the curve by numerical methods. He can determine the characteristics of the dynamic stability curve using numerical integration. He can determine the dynamic heeling moment of the wind acting on the ship. He knows the methods for determining the dynamic angle of heel from the wind using the documentation of the ship. Understand the concept: a critical lever, the basic criterion of the weather. He can determine the dynamic angle of heel and check the weather criterion in terms of ship's rolling.
LO10	The student understands the concept of stability criteria. He knows the stability criteria by IMO rules for some types of ships. He can check the criteria in terms of initial stability, righting and dynamic lever curve by selected regulations. He is able to define and interpret differences in the results for the criteria by different rules. He can check the stability of the ship for the transportation of grain.
LO11	The student understands the basic concepts of the strength of the hull. He knows the load exerted on the hull during operation. Understand the concept of the overall strength of the hull: hogging and sagging, cutting forces and bending moments. He knows the method of determining and checking the overall strength of using curves: weights, buoyancy, cutting forces and bending moments. He can make a curved cutting forces and bending moments rectangular pontoon for various loading conditions. He knows the documentation and software to control the ship's hull strength.
LO12	The student understands the concept of damage stability. He knows the basic concepts unsinkability and basic rules of conduct in case of hull damage. He can determine the damage stability. He knows and is able to use the documentation and information on the stability for the captain. He can determine the balance and stability of the vessel strength during ballast water exchange.
LO13	The student understand capacity tanks and cargo holds tables. He knows how to use these tables. Student can determine (using these tables) parameters of individual cargo holds or placed there loads necessary for stability calculations and planning loading. He knows the rules of the precise determination of displacements by measuring of drafts with the adjustments to the trim and the density of water. He it is able to determine the displacement of the ship, the weight of cargo loaded or unloaded during ship operation and planning of the load status. He knows computer software for the optimization of load condition.
LO14	The student understands the basic concepts of the ship's rolling and the phenomena of oscillation. He can prevent excessive ship's rolling. Student is able to determine the effect of loading condition, the ship's speed, sea condition on rolling and stability of the vessel. He understands the phenomenon of ship rolling resonance. He knows the principle of avoiding dangerous situations in adverse weather conditions. He knows the rules and tools for practical stability control systems.
LO15	Student knows hull's equipment and its division. He knows the types of selected elements of the hull equipment: a) hold equipment: hold closing; b) mooring equipment: bollards, chocks, plain and roller fairleads, winches c) anchor equipment: anchor chains, anchor device, anchor chain chamber, protection the anchors; d) on-board equipment: masts, booms and on board's cranes; e) basic systems: ballast, bilge, venting sounding. He knows the types of steering systems and thrusters, including propellers. Student understands the phenomenon of material's corrosion used on the hulls. He knows methods of corrosion preventing. He knows the rules of ship conservation, repairs and survey planning and preparing ship to the dock.

STRUCTURE OF SUBJECT

	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1, LEC2	3	EX1	3				
LO2	LEC3-5	4	EX2-4	4				
LO3	LEC6, LEC7	5						
LO4	LEC8-10	3	EX5-7	3				
LO5	LEC11	1	EX8	2				
LO6	LEC12	1	EX9	2				

LO7	LEC13, LEC14	2	EX10, EX11	3			
LO8	LEC15	9					
LO9	LEC16	3	EX12	3			
LO10	LEC17	3	EX13	2			
LO11	LEC18-20	9					
LO12	LEC21-25	15	EX14-17	5			
LO13	LEC26, LEC27	4	EX18, EX19	3			
LO14	LEC28	3	EX20-22	3			
LO15	LEC29	10					
Total hours		75		33		0	0

SUBJECT MATTER CONTENT

LEC1	Equation of ship's balance. Basic concepts and definitions buoyancy, displacement, mass and gravity center of the ship, the center of buoyancy.
LEC2	The geometry of the hull. Basic information about the shape of the hull - the coordinate system related to the hull, the plane lines, theoretical dimensions of the hull, coefficients of form.
LEC3	The weight and the coordinates of the center of mass of the ship, the concept of static moment. Buoyancy, center of buoyancy, the line of buoyancy force.
LEC4	The characteristics of the geometry of the hull, hydrostatic curves, Bonjeana's scale, the scale of load, Firsow's graph. Specifying the hydrostatic hull on the basis of ship's documentation. The influence of the density of sea water on the draught of the ship.
LEC5	Changes in buoyancy and the coordinates of the center of mass of the ship after the adding, removing and moving cargo on the ship.
LEC6	Institutions of Ship Classification, classification requirements for ships, freeboard mark freeboard inspections required by the Convention LL.
LEC7	The division of ships, the basic characteristics and operation parameters, general plans, tanks' plans and schemes of different types of ships.
LEC8	Initial Stability. Metacenter radius, metacentric height, righting moment, states balance the ship. Calculating the angle of heel.
LEC9	Longitudinal stability. Trim and angle of trim. Bow and stern draft.
LEC10	Changing the heel, trim and draft during the cargo and ballast tanks operation.
LEC11	Correction to the free surface, the impact of suspended loads, the effect of icing on changing the position of the center of mass of the ship.
LEC12	Stability at large angles of heel. Shape and weight stability lever, Pantocarena's diagram, righting lever, righting lever curve.
LEC13	Static angle of heel and its correction. Static heeling moments.
LEC14	Heeling test, rules for the implementation, analysis of test results by the rules of a classification society.
LEC15	Hull structure, primary bond linkages and arrangements of the hull. Materials used for the hull. The technology of welding. Selected nodes structural bottom, sides, deck, bow, stern. Subdivision and construction of the bulkhead. Hull structure.
LEC16	Dynamic stability, working of the righting lever, lever of dynamic stability, dynamic stability curve, angle of heel for of the dynamic external heeling moments acting dynamically, flooding angle.
LEC17	Ship stability Code. Stability roles according to Classification Associates and international regulations. Permissible height of the gravity center of the vessel. The stability of the of grain transportation.
LEC18	Overall strength of the hull. Loads hull structure, hull deflection. Curves of weights, buoyancy, cutting forces and bending moments. The strength of the hull in rough seas.
LEC19	Documentation and software to control the strength of the hull.

LEC20	Determining cutting forces and bending moments for a rectangular pontoon.
LEC21	Damage Stability and ship unsinkable, permeability, bulkhead deck, damage dimension of the hull. The requirements of SOLAS, and IMO.
LEC22	Determination of damage stability using added mass or fixed displacement method.
LEC23	Determining the ship stability during grounding.
LEC24	Using ship's stability documentation and information for the captain to determine the stability of the ship in operation.
LEC25	Determination of balance, stability and strength of the ship during ballast water exchange using the ship stability documentation.
LEC26	Determining the weight of the load on the ship. Scaling tanks and cargo holds.
LEC27	Planning the loading condition of the vessel taking account of any operational factors. Computer software for use in optimizing the loading condition.
LEC28	Basic information of the ship's rolling. Methods for preventing excessive-rolling. The influence of loading condition, the ship's speed, sea condition and the angle of incoming wave on rolling and ship's stability. The phenomenon of resonance oscillations. The principle of avoiding dangerous situations in bad weather conditions. Rolling test.
LEC29	Hull equipment: closing the hold and interdeck, mooring equipment: bollards, chocks, plain and roller fairleads, winches, anchor device, anchor chain chamber, presenting the anchors, ropes alloying, masts, booms and cranes onboard systems: ballast, bilge, venting sounding. Steering devices and thrusters, including propellers. The phenomenon of hulls materials corrosion. Methods of corrosion preventing. Rules of the ship maintenance, repairs and maintenance planning. Preparation ship to the dock.
EX1	Determining the weight and the coordinates of the gravity center of the ship on the basis of the masses table.
EX2	Determining the volume of displacement, buoyancy and coordinates of the center of buoyancy.
EX3	Determining the weights, buoyancy and coordinates of the gravity center of the ship after the adding, moving and removing cargo on the ship.
EX4	Determination of drafts based on readings on the scale of draughts with the use of ship stability documentation.
EX5	Calculation of metacentric height on the basis of the documentation.
EX6	Calculation of trim and the bow and stern draft.
EX7	Determining the angle of heel, trim, bow and stern draft during cargo and ballast operations and changes of water density.
EX8	Determination of correction of the metacentric height due to free surface effect.
EX9	Determining of righting lever curve on the basis of the documentation.
EX10	Determining the static angle of heel on the righting lever curve.
EX11	Execution of heeling test of the ship model at the swimming pool by regulations of Classification Institution.
EX12	Determining the dynamic angle of heel, angle of flooding using ship documentation.
EX13	Check the ship's stability criteria for the various loading conditions with the use of ship documentation.
EX14	Determining the position and stability of the ship after flooding the compartment using added mass method and the fixed displacement method.
EX15	Determining the stability of the ship after grounding.
EX16	Determining the stability of the ship for various loading conditions Using of stability information for the captain.
EX17	Checking the stability of the ship during ballast water exchange.
EX18	Determining the weight of cargo in the holds and tanks based on scaling tables.
EX19	Determination of displacements and the quantity of cargo on the vessel by measuring drafts (drafts survey).
EX20	Determination of the period of own oscillations. Determining the metacentric height based on a ship rolling test.

EX21	Determination of dangerous heading angles and speed to avoid resonance rolling of the ship.									
EX22	Determining the ship's stability on the stern (following) quartering seas.									
TEACHING AIDS										
1	Notebook with projector.									
2	Table.									
3	Computers.									
4	Laboratory stand bed.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
F1	Homework (LO2, LO6, LO9, LO12, LO13).									
F2	Presentation (LO7, LO8).									
S1	Final test no 1 (LO1 ÷ LO5).									
S2	Final test no 2 (LO6 ÷ LO10).									
S3	Final test no 3 (LO11, LO12).									
S4	Final test no 4 (LO13 ÷ LO15).									
S5	Writing exam (LO1 ÷ LO15).									
STUDENT WORKLOAD										
Form of activity	Number of hours per semester									Total
	0	I	II	III	IV	V	VI	VII		
Contact hours:	0	0	0	0	36	36	36	0	108	
<i>Lectures</i>					19	29	27		75	
<i>Exercises</i>					17	7	9		33	
<i>Laboratories</i>									0	
<i>Simulator</i>									0	
Student work:	0	0	0	0	36	36	36	0	108	
<i>Preparation for classes</i>					36	36	36		108	
TOTAL NUMBER OF HOURS	0	0	0	0	72	72	72	0	216	
Number of ECTS points					3	3	3		9	
LITERATURE										
Basic										
1	Dokkum Von K.: Ship Stability, 2008.									
2	Derett R.: Ship stability for Masters and Mates, BH, Oxford 2003.									
3	Pawłowski M.: Subdivision and damage stability of ships, Gdańsk 2004.									
4	Staliński J.: Ship's theory, 1961.									
Recommended										
1	Semi-container Type B-354, Documentation for stability calculations 2009.									
2	Documentation: Damage stability calculations for Ro-Ro vessel.									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Waldemar Mironiuk, w.mironiuk@amw.gdynia.pl									

B.II.8 Management of the ship

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Management of the ship (O)
2. Code of subject:	Xjc
3. Department:	Department of ship's exploitation
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	V
10. Profile:	Practical
11. Lecturer:	Master Mariner Mirosław Janikowski
12. Date of update:	10 March, 2018
* O/S – obligatory / selection	
AIM OF SUBJECT	
A1	Basic technical and operational parameters of ships and their individual characteristics. Basic and derivative forms of ship operation. Analysis of the content and meaning as well as the principles of using documents characteristic of basic and derivative forms of exploitation of the asset.
A2	Organization and documentation of transport in liner shipping: booking agreement, loading list, control receipt, mate's receipt, receipt of a helmsman, bill of lading, sea bill of lading, cargo manifest. Interpretation of the most important clauses of the bill of lading and sea consignment note.
A3	Organization of charter flights, types of charters, on hire, off hire condition. Documentation of charter flights: charter contract, notices, notice of readiness, statement of facts sheet, time tape, laydays, laytime, settlement of permitted time, survey inspection.
A4	Maritime ship transport documents and certificates resulting from the SOLAS, LL, MARPOL, TONNAGE, CLC, MLC, WHO conventions, codes: IMSBC, IMDG, IGC and others; documents of identification, classification, security, sanitary, manned, cargo and passenger.
A5	The ship's books with special emphasis on the logbook. Knowledge of the issues of ship classification, the rules for obtaining classification documents, the ability to properly distinguish the required documents.
A6	Knowledge and understanding of the rules for the use of ship's documentation in accordance with the relevant Convention guidelines, including ship logs, documents resulting from SOLAS 74, Load Lines 66, MARPOL 73/78, Tonnage 69, FAL 65, CLC 69, MLC 2006, WHO, IMSBC codes and IMDG. The ability to use appropriate documents.
A7	Knowledge of the basics of the FAL 65 Convention, the rules of entry, departure and transit clearance, knowledge of the operation of the port and shipping environment, the manner of conducting, documentation of briefings, PSC inspections, correct interpretation of the principles of cooperation with service providers. Procedures and documents related to the ship's check-in, departure and transit.
A8	ISM Code. Ship inspections. Ship's cooperation with the port. ISPS Code regulation.
A9	Organization of the ship's crew: organization and scope of the port watch duty, management of the ship's crew, employment conditions, employee evaluation. MLC 2006 Convention. Muster roll.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Knowledge of mathematics and physics at high school level.

2	Knowledge of basic international maritime law regulation.							
3	Passed course of Seamanship, Occupational safety and health, Navigation I.							
LEARNING OUTCOMES								
LO1	Student knows the basic technical and operational parameters of ships and their individual characteristics. Basic and derivative forms of ship operation. Analysis of the content and meaning as well as the principles of using documents that are characteristic for basic and derived forms of ship operation.							
LO2	Student knows the organizer and documentation of transport in a liner: a booking agreement, a loading list, a check receipt, a helmsman's receipt, a Bill of Lading, a maritime waybill, a cargo manifest. Interpretation of the most important clauses of the bill of lading and sea consignment note. He/Student can use documents.							
LO3	Student know the organization of charter flights, types of charters. Documentation of charter flights: charter contract, notices, notice of readiness, statement of facts, time sheet, laydays, laytime, settlement of permission, voyage instruction.							
LO4	Student knows, understands and correctly distinguishes documents and certificates of a marine transport vessel resulting from the SOLAS, LL, MARPOL, TONNAGE, CLC, MLC, WHO conventions, codes: IMSBC, IMDG, IGC and others; documents of identification, classification, security, sanitary, manned, cargo and passenger.							
LO5	Student knows the basics of the ISM Code. Distinguishes Ship inspections. He knows the principles of cooperation between the ship and the port. He now also how to use the books with special emphasis on the logbook and others record books. Issues of ship classification, rules for obtaining classification documents, similarities and differences in required documents.							
LO6	Student knows and understands the rules of using the ship's documentation in accordance with the relevant Convention guidelines, including: ship logs, documents resulting from the SOLAS 74 Convention, Load Lines 66, MARPOL 73/78, Tonnage 69, FAL 65, CLC 69, WHO, IMSBC Codes and IMDG. Has the ability to use appropriate documents.							
LO7	Student knows and understands the rules of the organization and scope of the port watch duty, including cooperation with the port facility office/representative, acc. to ISPS Code.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	1						
LO2	LEC2	2						
LO3	LEC3	1						
LO4	LEC4	2						
LO5	LEC5	2						
LO6	LEC6	2						
LO7	LEC7	1	EX1	2				
LO5	LEC8	2						
LO7	LEC9	2	EX2	1				
Total hours		15		3		0		0
SUBJECT MATTER CONTENT								
LEC 1	Basic technical and operational parameters of ships and their individual characteristics. Basic and derivative forms of ship operation.							
LEC 2	Organization and documentation of transport in liner shipping: booking agreement, loading list, control receipt, receipt of a helmsman, bill of lading, sea bill of lading, cargo manifest. Interpretation of the most important clauses of the bill of lading and sea consignment note.							
LEC 3	Organization of charter flights, types of charters. Documentation of charter flights: charter contract, notices, notice of readiness, statement of facts, time sheet, laydays, laytime, settlement of permission, voyage instruction.							

LEC 4	Maritime ship transport documents and certificates resulting from the SOLAS, LL, MARPOL, TONNAGE, CLC, MLC, WHO conventions, codes: IMSBC, IMDG, IGC and others; documents of identification, classification, security, sanitary, manned, cargo and passenger.								
LEC 5	The ship's books with special emphasis on the logbook and oil record book. Issues of ship classification, rules for obtaining classification documents, similarities and differences in required documents.								
LEC 6	Use the ship's documentation in accordance with the relevant Convention guidelines, including: ship logs, documents resulting from the SOLAS 74 Convention, Load Lines 66, MARPOL 73/78, Tonnage 69, FAL 65, CLC 69, WHO, IMSBC and IMDG codes. Using appropriate documents.								
LEC 7	The basis of the FAL 65 Convention, the rules of entry, departure and transit clearance, the principles of operation of the port-shipping environment, the manner of conducting, documentation of briefings, PSC inspections, correct interpretation of the principles of cooperation with service providers. Procedures and documents related to the ship's check-in, departure and transit.								
EX1	Documentation of briefings, PSC inspections, interpretation of the principles of cooperation with service providers. Procedures and documents related to the ship's check-in, departure and transit. ISM & ISPS Code.								
LEC 8	ISM Code. Ship inspections. Ship's cooperation with the port. ISPS Code regulation.								
LEC 9	The rules of organising and watch keeping at port.								
TEACHING AIDS									
1	Notebook and multimedia projector.								
2	Folios projector.								
3	Whiteboard and colour felt-tips.								
4	SOLAS, STCW, ISPS, MARPOL, COLREG.								
5	FAL Convention.								
6	ISM, SMS.								
7	IMSBC and IMDG codes								
8	Ship-owner forms.								
9	Charter's agreements.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Computational task (EX1).								
S1	Test (LO1 - LO7).								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	0	0	18	0	0	18
<i>Lectures</i>						15			15
<i>Exercises</i>						3			3
<i>Laboratories</i>									0
<i>Simulator</i>									0
Student work:	0	0	0	0	0	18	0	0	18
<i>Preparation for classes</i>						18			18
TOTAL NUMBER OF HOURS	0	0	0	0	0	36	0	0	36
Number of ECTS points						1,5			1,5
LITERATURE									
Basic									
1	Revised ISM Code, effective as from 1 January 2015.								
Recommended									

1	Safe of Life at Sea, STCW Convention, IMDG Code, ISPS Code, ISM Code, Ship Management System.
2	Ship's Management International, edition March/April 2016.
3	The Code of safe working practice for merchant seafarers (COSWP). Edition 04 September 2015.
4	Guide to port entry.
5	Convention on Facilitation of International Maritime Traffic (FAL).
6	Willange M., Spruyt J.: Ship management, LLP 1998.
7	Safety Management System Manual Guidebook, Developed by: Commandant (G-MSO-2) U.S. Coast Guard.
LECTURER (NAME AND SURNAME, E-MAIL)	
1	Mirosław Janikowski, mpjan@poczta.onet.pl

B.II.9 Marine transportation

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Marine transportation (O)
2. Code of subject:	Xjc
3. Department:	Department of Ship's Exploitation
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	V
10. Profile:	Practical
11. Lecturer:	Master Mariner Leszek Stępień, Master Mariner Lech Soroka
12. Date of update:	10 March, 2018
<i>* O/S – obligatory / selective</i>	
AIM OF SUBJECT	
A1	The knowledge of classification of cargo, characteristics of cargo properties in sea transport and cargo damage.
A2	The acquaintance with dangerous goods, IMDG and IMSBC codes, classification, packaging and labelling, segregation rules, precautions during handling and transport.
A3	The understanding of protection method of cargo in sea transport taking into account their properties, procedures for delivery, qualitative and quantitative control and collection of cargo, factors contributing to the change of cargo quality in transport, stowage and segregation materials, cargo securing equipment, securing rules, cargo handling equipment and accessories, deck cargo transporting and securing rules and transport and securing of heavy items.
A4	The acquaintance with operation of general cargo ships incl. refrigerated vessels, container ships and ro-ro ships, carriage of timber.
A5	The acquaintance with operation of bulk carriers, measuring of cargo mass based on ship draught readings, technology of bulk cargo carriage, carriage of grain in bulk.
A6	The acquaintance with carriage of liquid cargo, washing of tanks, environmental protection regulations, safety measures upon entering enclosed or polluted spaces, using of cargo calculator and other aids for calculations related to cargo handling.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Basic knowledge on mathematics and physics.
2	First Medical Aid Certificate.
3	Passed course of Seamanship, Occupational Safety and Health and Navigation I.
LEARNING OUTCOMES	
LO1	Student has knowledge about classification of cargo, cargo properties in sea transport and cargo damage.
LO2	Student has knowledge concerning codes on carriage of dangerous goods and understand risk during dangerous cargo handling and carriage.
LO3	Student knows how to perform supervision of cargo handling operations and preparation of cargo holds, is able to read a stowage plan, knows types and purpose cargo handling equipment and accessories,

LO4	Student knows issues concerned with carriage of timber, general cargo and heavy untypical items, terminology related to container transport system, horizontal loading systems of ro-ro ships.							
LO5	Student knows problems related to carriage of selected bulk cargoes, such as grain, coal, ore concentrates, knows how to measure of cargo mass based on ship draught readings.							
LO6	Student knows requirements related to carriage of liquid cargo and is able to assess a risk and protection measures upon entering enclosed or polluted spaces.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	3						
LO2	LEC2	8	EX1	2				
LO3	LEC3-4	6	EX2	1				
LO4	LEC5-8	8						
LO5	LEC9-11	9	EX3	2				
LO6	LEC12-14	6						
Total hours		40		5		0		0
SUBJECT MATTER CONTENT								
LEC 1	Classification of cargo. Characteristics of cargo properties in sea transport. Unit loads in sea transport. Cargo damage reports.							
LEC 2	Dangerous goods, IMDG and IMSBC codes, classification, packaging and labelling, segregation rules, precautions during handling and transport.							
EX1	Work with IMDG Code.							
LEC 3	Protection of cargo in sea transport taking into account their properties. Procedures for delivery, qualitative and quantitative control and collection of cargo. Factors contributing to the change of cargo quality in transport. Stowage and segregation materials, cargo securing equipment, securing rules.							
EX2	Supervision of cargo handling operations and preparation of cargo holds.							
LEC 4	Ship cargo handling equipment and accessories, types and purpose, maintenance of equipment, instructions, occupational health and safety during cargo handling.							
LEC 5	Operation of general cargo ships and refrigerated vessels. Transport and securing of project cargo and heavy items.							
LEC 6	Operation of container ships.							
LEC 7	Operation of ro-ro ships.							
LEC 8	Carriage of timber.							
LEC 9	Operation of bulk carriers and technology of bulk cargo carriage based on coal and ore concentrates instances.							
LEC 10	Measuring of cargo mass based on ship draught readings.							
LEC 11	Carriage of grain in bulk.							
EX3	Planning of cargo operations and use of different calculation forms.							
LEC 12	Carriage of liquid cargo, washing of tanks, environmental protection regulations.							
LEC 13	Safety measures upon entering enclosed spaces or polluted rooms.							
LEC 15	Use of cargo calculator and other aids for calculations related to cargo handling.							

TEACHING AIDS									
1	Notebook and multimedia projector.								
2	Folios projector.								
3	Whiteboard and colour felt-tips.								
4	IMDG Code, IMSBC Code, Blue Code, CSS Code.								
5	Nautical publications.								
6	Pocket calculators.								
7	Calculation Forms								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Computational task (EX1).								
S1	Test (LO1 - LO3).								
F2	Computational task (EX3).								
S2	Test (LO4 - LO6).								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	0	0	45	0	0	45
<i>Lectures</i>						40			40
<i>Exercises</i>						5			5
<i>Laboratories</i>									0
<i>Simulator</i>									0
Student work:	0	0	0	0	0	45	0	0	45
<i>Preparation for classes</i>						45			45
TOTAL NUMBER OF HOURS	0	0	0	0	0	90	0	0	90
Number of ECTS points						4			4
LITERATURE									
Basic									
1	Thomas R.E.: The Properties and Stowage of Cargoes, Brown, Son&Ferguson, LTD., Glasgow, 2002.								
Recommended									
1	The International Maritime Dangerous Goods Code (IMDG Code) includes revisions to various sections of the Code and to transport requirements for specific substances, IMO 2016 Edition – Amendment 38-16.								
2	The International Maritime Solid Bulk Cargoes Code and supplement, IMO 2018 Edition, incorporating amendment 04-17.								
3	Code of Practice for the Safe Loading and Unloading of Bulk Carriers (including BLU Manual), IMO 2011 Edition.								
4	International Grain Code (1991 Edition).								
5	Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2011, IMO 2012 Edition.								
6	The Code of Safe Practice for Cargo Stowage and Securing presents amendments to the CSS Code, IMO 2011 Edition).								
7	The International Convention for Safe Containers, 1972 (CSC 1972), IMO 2014 Edition.								
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Leszek Stępień, l.stepien@amw.gdynia.pl								
2	Lech Soroka, l.soroka@amw.gdynia.pl								

B.II.10 Maritime law

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Maritime law (O)
2. Code of subject:	
3. Department:	Department of ship's exploitation
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	V
10. Profile:	Practical
11. Lecturer:	
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	Elementary knowledge of maritime law necessary for a watch officer in all forms of ship operation.
A2	Knowledge of international conventions, regulations and recommendations relating directly to the duties performed by the ship and its crew.
A3	Knowledge of issues: International maritime organizations. Legal status of sea areas. Nationality of the vessel.
A4	Know the basic legal provisions related to the safety of the ship, crew, passengers and cargo, within the competence of the watch officer.
A5	Knowledge of the issue: Maritime Administration.
A6	Knowledge of basic regulations related to the safety of a ship, crew, passengers.
A7	Knowledge of the issue: ship inspections.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Passed course of Marine transportation.
LEARNING OUTCOMES	
LO1	Student has knowledge about maritime law necessary for a watch officer in all forms of ship operation.
LO2	Student has knowledge of international conventions, regulations and recommendations relating directly to the duties and obligations of the ship and the responsibilities of its members.
LO3	Student has knowledge about international maritime organizations, legal status of sea areas, nationality of the vessel.
LO4	Student has knowledge the basic legal provisions related to the safety of the ship, crew, passengers and cargo, within the competence of the watch officer.
LO5	Student has knowledge about Maritime Administration.
LO6	Student knows and understands basic regulations related to the safety of a ship, crew, passengers.
LO7	Student has knowledge about ship inspections.
STRUCTURE OF SUBJECT	

	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	2						
LO2	LEC2	2						
LO3	LEC3	2						
LO4	LEC4, LEC8-10	8						
LO5	LEC5	2						
LO6	LEC6	2						
LO7	LEC7	2	EX1	2				
Total hours		20		2		0		0

SUBJECT MATTER CONTENT

LEC1	The concept, subject, and systematics of maritime law.
LEC2	The sources of domestic and international maritime law, international conventions.
LEC3	International organizations and maritime organizations.
LEC4	The legal status of sea areas.
LEC5	The state affiliation of a ship.
LEC6	A ship register.
LEC7	Maritime administration. Sea inspection.
LEC8	Cargo transport by sea.
LEC9	Passenger transport by sea.
LEC10	Sea rescue.
EX1	Test.

TEACHING AIDS

1	Notebook and multimedia projector.
2	Folios projector.
3	Whiteboard and colour felt-tips.
4	Conventions: SOLAS 74, SAR 79, COLREG.

METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)

S1	Test (LO1 - LO7).
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STUDENT WORKLOAD

Form of activity	Number of hours per semester								Total	
	0	I	II	III	IV	V	VI	VI		
Contact hours:	0	0	0	0	0	2	2	0	0	22
<i>Lectures</i>						2	0			20
<i>Exercises</i>						2				2
<i>Laboratories</i>										0
<i>Simulator</i>										0
Student work:	0	0	0	0	0	2	2	0	0	22
<i>Preparation for classes</i>						2	2			22
TOTAL NUMBER OF HOURS	0	0	0	0	0	4	4	0	0	44
Number of ECTS points						2				2

LITERATURE

Basic

1	Conventions: SOLAS 74, SAR 79, COLREG.
Recommended	
1	Safe of Life at Sea, STCW Convention.
2	Ship's Management International, edition March/April 2016.
3	The Code of safe working practice for merchant seafarers (COSWP). Edition 04 September 2015.
LECTURER (NAME AND SURNAME, E-MAIL)	
1	

B.II.11 Ship's safety

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Ship's safety (O)							
2. Code of subject:	Xfg							
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	V							
10. Profile:	Practical							
11. Lecturer:	Master Mariner MSc Eng. Lech Soroka							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	To teach the main information about the source of Sea Law – International Maritime Organisation.							
A2	The familization with other source of information about Safety on board- Solas convention and Marpol.							
A3	To teach how to use the main manual on board /ISM code/ Ships Safety Manual.							
A4	The familization with all documentation and forms for Safety on board acc. S.S.M.							
A5	The acquaintance with Watch Officer duties on various danger situations on board.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Students have basic knowledge source of sea low and organisation established it.							
2	Students have basic knowledge about ships documentations, forms and check list.							
LEARNING OUTCOMES								
LO1	Demonstrate the knowledge basic information about organisation and purpose of I.M.O.							
LO2	Demonstrate the knowledge of other Conventions SOLAS, Marpol and Codes for Safety.							
LO3	Demonstrate the knowledge of main manual on board ISM Code.							
LO4	Demonstrate the knowledge of ships documentation and forms acc. Ships Safety Manual.							
LO5	Demonstrate the ability to use Ships Safety forms - check list in practical operations.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	2						
LO2	LEC2	4						
LO3	LEC3	5						
LO4	LEC4	2	EX1	3				
LO5	LEC5	2						
Total hours		15		3		0		0
SUBJECT MATTER CONTENT								

LEC 1	Introduction to the course - the source of Sea Low (2).									
LEC 2	Fundamentals about the Safety Conventions and Safety Codes (4).									
LEC 3	Information about Main Safety Manual - contents, forms and other documents (5).									
LEC 4	Classification of safety documents, Check List, N.C.R., F.C.R - Audits and P.S.C. controls (2).									
LEC 5	Responsibilities of the Officer on Watch on different situation and operations on board acc. ISM (2).									
EX1	Practical operations on board acc. Check List and safety instruction at sea and in port.									
TEACHING AIDS										
1	Computer with multimedia projector.									
2	Original ship's documentation and forms in English.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
S1	Written test.									
S2	Positive result of practical use the original ship's NCR and FCR during the exercise.									
STUDENT WORKLOAD										
Form of activity		Number of hours per semester								Total
		0	I	II	III	IV	V	VI	VII	
Contact hours:		0	0	0	0	0	0	0	18	18
<i>Lectures</i>									15	15
<i>Exercises</i>									3	3
<i>Laboratories</i>										0
<i>Simulator</i>										0
Student work:		0	0	0	0	0	0	0	18	18
<i>Preparation for classes</i>									18	18
TOTAL NUMBER OF HOURS		0	0	0	0	0	0	0	36	36
Number of ECTS points									1,5	1,5
LITERATURE										
Basic										
1	Conventions SOLAS, Marpol, STCW and ISM Code, ISPS Code.									
2	Original ship's documentation, certificates and forms in English.									
Recommended										
1	Other codes – Code of sea Practice, Safety of Work, Bulk code AMSA.									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Lech Soroka, l.soroka@amw.gdynia.pl									

B.II.12 Marine environmental protection

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Marine environmental protection (O)							
2. Code of subject:								
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	VI							
10. Profile:	Practical							
11. Lecturer:								
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	Introduce students with the overview of maritime environment protection problems.							
A2	Familiarize students with regulations of main environment protection-related maritime convention (MARPOL, INTERVENTION, CLC).							
A3	Familiarize students with environment friendly rules of operation at ships.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Advanced seamanship knowledge.							
LEARNING OUTCOMES								
LO1	Student understands the importance of marine environment protection in ships operation.							
LO2	Student knows the characteristic of MARPOL convention and its main regulations. Student is also able to use the document in planning and executing activities at sea.							
LO3	Student knows the characteristic and main regulations of INTERVENTION, CLC and London Conventions.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	1						
LO2	LEC2-5	7						
LO3	LEC6	2	EX1	1				
Total hours		10		1		0		0
SUBJECT MATTER CONTENT								
LEC 1	Introduction to the course. The importance of marine environmental protection (1).							

LEC 2	Introduction to MARPOL convention (1).								
LEC 3	Oil pollution prevention and noxious liquid pollution avoidance. MARPOL convention - characteristics of Annexes I-II (2).								
LEC 4	Prevention of pollution by packaged harmful substances and sewage from ships. MARPOL convention - characteristics of Annexes III-IV (2).								
LEC 5	Garbage and air pollution awareness. MARPOL convention - characteristics of Annexes V-VI (2).								
LEC 6	INTERVENTION Convention, CLC Convention and London Convention (2).								
EX1	Final assignment (1).								
TEACHING AIDS									
1	Lecture with multimedia presentation.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Test (60%).								
F2	Students activity (40%).								
S1	Weighted Average Rating Factor S1 = (0,6 F1 + 0,4 F2).								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	0	0	0	11	0	11
<i>Lectures</i>							10		10
<i>Exercises</i>							1		1
<i>Laboratories</i>									0
<i>Simulator</i>									0
Student work:	0	0	0	0	0	0	11	0	11
<i>Preparation for classes</i>							11		11
TOTAL NUMBER OF HOURS	0	0	0	0	0	0	22	0	22
Number of ECTS points							1		1
LITERATURE									
Basic									
1	Schiewer U.: Ecology of Baltic Coastal Waters, Springer, Berlin 2008.								
2	International Convention for the Prevention of Pollution from Ships (MARPOL).								
3	The International Convention on Civil Liability for Oil Pollution Damage (CLC).								
4	Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention), 1992.								
5	Ryden L., Migula P., Andersson M.: Environmental Science, Upsala 2003.								
6	Ribeiro M.C., Molenaar E.J.: Maritime Safety and Environmental Protection in Europe, 2014.								
Recommended									
1	Wiewióra A.: Ochrona środowiska morskiego, Fundacja WSM w Szczecinie, Szczecin 1998.								
2	Korzeniowski K.: Ochrona środowiska morskiego, UG, Gdańsk 1998.								
3	Kaniewski E., Łączyński H.: Ochrona środowiska morskiego - zagadnienia techniczne i prawne, WSM, Gdynia 2000.								
4	Bądkowski A.: Rozlewy olejowe na morzu, 1985.								
LECTURER (NAME AND SURNAME, E-MAIL)									
1									

B.II.13 Maritime search and rescue

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Maritime search and rescue (O)
2. Code of subject:	Qxs
3. Department:	Department of Ship's Exploitation
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	VI
10. Profile:	Practical
11. Lecturer:	PhD Eng. Andrzej Królikowski
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	The acquaintance with legal basis of maritime search and rescue and salvage operations at sea.
A2	The acquaintance with global SAR system concept, establishment of national and regional SAR systems.
A3	The acquaintance with equipment of life boats and rafts and rescue boats.
A4	The acquaintance with the systems of launching life boats and rafts and fast rescue boats.
A5	The acquaintance with methods of evacuating people from cargo ships in danger.
A6	The acquaintance with methods of evacuating people from passenger ships and passenger ro-ro ships in danger and care for passengers.
A7	The acquaintance with the behaviour of castaway's ship life equipment.
A8	The acquaintance with the rules of survival at sea.
A9	The acquaintance with the search and rescue manual IAMSAR.
A10	The acquaintance with the organization of search and rescue operations compliant with IAMSAR.
A11	The acquaintance with the assistance in hazard.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Basic knowledge on mathematics and physics.at the high school level.
2	Basic knowledge on personal survival techniques.
3	Basic knowledge on Navigation I and Seamanship.
LEARNING OUTCOMES	
LO1	Student knows basics terms of maritime rescue action.
LO2	Student knows operating rules of global systems concept, establishment of national and regional SAR systems.
LO3	Student knows international rescue procedure broadly defined but focusing on lifesaving, international legal regulations on the marine rescue equipment.
LO4	Student knows topics in maritime procedures according to IAMSAR, issues of international conventions, and recommendations for the crews.
LO5	Student knows topics in planning and conducting the search, coordination of search and rescue operations, on board emergencies, assistance by SAR aircraft.

STRUCTURE OF SUBJECT									
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours	
LO1	LEC1	2	EX1	3					
LO2	LEC2	2							
LO3	LEC3	4							
LO4	LEC4	4							
LO5	LEC5	3							
Total hours		15		3		0		0	
SUBJECT MATTER CONTENT									
LEC 1	Legal basis of Solas Ch/III and LSA Code.								
LEC 2	Convention for the SAR, IAMSAR - operating rules of global system concept, national and regional SAR systems.								
LEC 3	Requirements for ship and life-saving appliances, passenger ships and cargo ships: communications, personal life-saving appliances, muster list and emergency instructions, survival craft muster and embarkation arrangements, lanching stations, stowage of survival craft and rescue boats and marine evacuation systems, rescue boat embarkation, launching and recovery arrangements passenger ship survival craft and ro-ro passenger ships - additional requirements, Solas CH/V Regulation 33: Distress messages: obligations and procedure.								
LEC 4	Mobile facilities, rendering assistance, On- Scene Co-ordination, On-board Emergencies, Search action message, SITREP, SAR -Coordination, SAR Coordinators, SAR Mission Coordinator, On- Scene Coordinator, vessel assisting, methods of Distress Notification, Immediate Action, proceeding to the area of distress. On board preparation life - saving and rescue equipment, signalling equipment, preparations for medical assistance.								
EX1	Search function: search action plan and message, developing own search planning, search patterns, on- scene radiocommunications, visual communication, look out day and night. Rescue function: rescue action plan and message, developing a rescue plan. MEDEVAC medical evacuation by helicopter. Person overboard, standard form of recovery.								
LEC 5	Ship Emergencies at Sea: shipboard fire, grounding, hull damages, abandoning ship, medical emergencies, unlawful acts, pirates and armed robbers.								
TEACHING AIDS									
1	Notebook and multimedia projector.								
2	Folios projector.								
3	Whiteboard and colour felt-tips.								
4	Nautical charts, triangles and dividers.								
5	SAR aids.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Written personal reports from tasks exercises (EX1).								
S1	Computational task.								
S2	Test.								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								
	0	I	II	III	IV	V	VI	VII	Total
Contact hours:	0	0	0	0	0	0	18	0	18
<i>Lectures</i>							15		15
<i>Exercises</i>							3		3
<i>Laboratories</i>									0
<i>Simulator</i>									0

Student work:	0	0	0	0	0	0	18	0	18
<i>Preparation for classes</i>							18		18
TOTAL NUMBER OF HOURS	0	0	0	0	0	0	36	0	36
Number of ECTS points							1,5		1,5
LITERATURE									
Basic									
1	IAMSAR t. III mobile facilities.								
2	SOLAS chapter III, LSA Code.								
Recommended									
1	COLREG 72, SAR 79 Convention, Salvage 69 Convention.								
2	Jurdzinski M.: Grounding.								
3	Burciu Z.: Bayesian methods in reliability of search and rescue action.								
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Andrzej Królikowski, a.krolikowski@amw.gdynia.pl								

B.II.14 Planning of navigation trip

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Planning of navigational trip (O)
2. Code of subject:	Qnh
3. Department:	
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Education cycle:	First-degree studies
8. Study mode:	Full-time studies
9. Semester:	VI
10. Profile:	Practical
11. Lecturer:	PhD Eng. Czesław Dyrz
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	The acquaintance with recommendations relating to planning the navigational trip in the light of the SOLAS convention and the IMO resolution, the STCW convention in the aspect of planning voyage and the watch officer duties.
A2	The familization with methods of using sources of information indispensable to work out the voyage plan, the content and the correction of the nautical publications relevant to the passage planning, the planning process and monitoring the passage.
A3	The acquaintance with watch officer duties on various stages of the trip, organization of the team work on the bridge.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Basic knowledge on navigation, meteorology and oceanography, ECDIS and safety in navigation.
2	Basic knowledge on electronics, electrical engineering and automation.
3	Basic knowledge on mathematics (trigonometry, vector analysis, differential and integral calculus).
LEARNING OUTCOMES	
LO1	The student has orderly general knowledge concerned with the main navigation-related issues in voyage planning and posses the skill of planning the passage route with regard to all the conditions and methods which support this process.
LO2	The student has detailed knowledge concerned with information sources and ways of acquiring information relating to navigation hazards.
LO3	The student has detailed knowledge concerned with the structure of a chart, its symbols, and is capable of correctly interpreting it in voyage planning.
LO4	The student has detailed knowledge concerned with fixing an object's position, using all available methods in voyage planning.
LO5	The student has detailed knowledge concerned with planning a route, determining safe route and monitoring it in accordance with international rules.
LO6	The student has orderly specialized knowledge covering key issues in the studied specialty concerning voyage planning.
LO7	The student can be capable of independently using specialized job-specific literature available in traditional and digital forms, and the Internet; be capable of integrating,

	assessing and properly interpreting acquired information, and making inferences, formulating opinions and taking actions, based on it.
LO8	The student critically analyses data obtained from navigation systems, understand limitations and errors relating to employed systems and properly evaluate the correctness of their performance using in voyage planning.
LO9	The student can be able to, in accordance with the presented specification, design or develop a simple appliance or process, typical of navigation, using appropriate methods, techniques and tools, as well as verify the correctness of the realization process, and determine the degree to which the design-related requirements have been fulfilled.
LO10	The student can operate navigation and communication appliances as well as measuring instruments, make use of nautical and communication publications; be able to use communication procedures in emergency situations, for the purposes of general safety and safety at sea.
LO11	The student has experience relating to use of proper materials and tools to solve exploitation-based tasks, obtained during student practical training.
LO12	The student can be able to appropriately define priorities in relation to executing tasks set by himself or someone else in voyage planning.
LO13	The student can correctly identify and settle dilemmas relating to his practiced profession, especially, concerned with aspects of safety in voyage planning.
LO14	The student knows and can be able to observe economic and legal requirements relating to his professional activity.

STRUCTURE OF SUBJECT

	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC0	1						
LO1	LEC1							
LO2	LEC2							
LO2	LEC3							
LO2	LEC4		EX0	3				
LO2	LEC5							
LO3; LO4	LEC6	1						
LO5	LEC7							
LO6	LEC8							
LO7; LO7; LO12	LEC9		EX1	6	LAB1	4		
LO7	LEC10							
LO7	LEC11	1						
LO11	LEC12							
LO11	LEC13							
LO10	LEC14							
LO14	LEC15							
LO7; LO11; LO13	LEC16	1	EX2	6	LAB2	4		
LO4; LO8	LEC17							
LO4; LO8	LEC18							

LO13	LEC19						
LO10	LEC20	1					
LO9; LO10; LO12; LO13	LEC21		EX3	5	LAB3	4	
	LEC22		TEST	3			
Total hours		5		23		12	0

SUBJECT MATTER CONTENT

LEC0	An introduction to the course: <i>Voyage Planning</i> .
LEC1	Recommendations for voyage planning according to the SOLAS Convention and IMO Resolution. Collection of navigational information. Ship's voyage planning from 'quay to quay'. Implementation of the plan and its voyage monitoring. Recommendations of the STCW Convention for voyage planning and watch officer duties.
LEC2	Recommendations of the STCW Convention for voyage planning and watch officer duties.
LEC3	The source of information necessary to develop a complete voyage plan.
LEC4	The content and the correction of marine nautical publications. Nautical Charts. <i>Pilots. Lists of Radio Signals. Ocean Passage for The World. Distance Tables. IMO Ship's Routeing. Mariner's Handbook. Guide to Port Entry.</i>
EX0	The content and the correction of marine nautical publications. Nautical Charts. <i>Pilots. Lists of Radio Signals. Ocean Passage for The World. Distance Tables. IMO Ship's Routeing. Mariner's Handbook. Guide to Port Entry.</i>
LEC5	The process of planning and monitoring of the transit of the ship.
LEC6	Responsibilities of the watch officer on different stages of implementation of ship's voyage with respect to the environmental aspects. The organization of teamwork on the bridge.
LEC7	Procedures for watch and emergency.
LEC8	Requirements for methods and frequency for plotting the position on the various stages of ship's voyage.
LEC9	Voyage planning on the oceanic and open waters.
LAB1, EX1	Voyage planning on the oceanic and open waters (ENGLISH CHANNEL - NEW YORK).
LEC10	Weather routes.
LEC11	Hydrometeorological conditions limiting the choice of the road of the ship.
LEC12	Navigation in the ice. The phenomenon of the sea ice. Voyage planning in areas of ice occurrence in the sea and land origin. Interpretation of ice charts and bulletins.
LEC13	Icing of ships. Phenomena of icing. Icing nomograms. Forecasting the possibility of icing of ship based on nomograms.
LEC14	Computer programs considering the weather conditions important in voyage planning for your ship.
LEC15	The use of land-based resorts weather driving the ship.
LEC16	Control methods of positions in the coastal and the pilot waters.
LAB2, EX2	Voyage planning in limited areas (BALTIC SEA).
LEC17	Control methods of positions in the coastal and the pilot waters.
LEC18	Control the position according the coastal and fairwater coordinates.
LEC19	Modification of the voyage plan during its implementation. The contingency plan.
LEC20	Registration and VTS systems.
LEC21	Log book.
LEC22	Automation of navigational calculations.
LAB3, EX3	Voyage plan from Port A to Port B (Arabian Gulf).

TEST	Summary - TEST.									
TEACHING AIDS										
1	Notebook and multimedia projector.									
2	Whiteboard and colour felt-tips.									
3	Synoptic and ice charts.									
4	Triangles and dividers.									
5	Nautical and meteorological publications.									
6	Pocket calculators.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
F1	Written personal reports from laboratory tasks and exercises (EX1, LAB1-3).									
S1	Comprehensive laboratories (LAB1-3; LO7, LO9, LO11, LO12, LO13, LO14).									
S2	Final test from planning of navigation trip (theoretical questions, voyage plan) (LO9; LO12; LO13).									
STUDENT WORKLOAD										
Form of activity		Number of hours per semester								Total
		0	I	II	III	IV	V	VI	VII	
Contact hours:		0	0	0	0	0	0	40	0	40
Lectures								5		5
Exercises								23		23
Laboratories								12		12
Simulator										0
Student work:		0	0	0	0	0	0	40	0	40
Preparation for classes								40		40
TOTAL NUMBER OF HOURS		0	0	0	0	0	0	80	0	80
Number of ECTS points								3,5		3,5
LITERATURE										
Basic										
1	Khaliq A., Anwer N.: <i>Passage Planning. Principles</i> , Witherby Publishing Group Ltd, Livingston 2017.									
2	Khaliq A., Anwer N.: <i>Passage Planning. Practice</i> , Witherby Publishing Group Ltd, Livingston 2015.									
3	Becker-Heins R.: <i>Voyage Planning with ECDIS</i> , Geomares Publishing, Lemmer 2016.									
4	Bowditch N.: <i>The American Practical Navigator</i> , National Imagery And Mapping Agency.									
Recommended										
1	Dyrcz C.: <i>Meteorology and Oceanography. Terms, definition and explanations</i> , AMW, Gdynia 2017.									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Czesław Dyrcz, c.dyrcz@amw.gdynia.pl									

B.II.15 Safety of navigation

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Safety of navigation (O)							
2. Code of subject:								
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	VI							
10. Profile:	Practical							
11. Lecturer:	Prof. Assoc. Stanisław Kołaczyński, PhD Eng. Andrzej Królikowski							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	Assessment of navigation safety.							
A2	Identification of navigational threats.							
A3	Prevention of navigational hazards.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Basic knowledge of hydrometeorology and oceanology.							
2	Basic knowledge of maritime science.							
3	Basic knowledge of Navigation.							
LEARNING OUTCOMES								
LO1	The maritime safety system in the world.							
LO2	The watch under way.							
LO3	Special features of watches in various conditions.							
LO4	Safety navigation: conduct of vessel in any condition of visibility.							
LO5	Safety navigation: conduct of vessel in sight of one another.							
LO6	Safety navigation: conduct of vessel in restricted visibility.							
LO7	Lights and shapes of the ship's signals.							
LO8	Sound and light signals.							
LO9	Annexes to the COLREG.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	4						
LO2	LEC2	4					SIM1	4
LO3	LEC3	4	EX1, EX2	4			SIM2	2
LO4	LEC4	6	EX3	2			SIM3	2
LO5	LEC5	4	EX4	2			SIM4	2

LO6	LEC6	6					SIM5	4
LO7	LEC7	4					SIM6	2
LO8	LEC8	4					SIM7	2
LO9	LEC9	4	EX5	2			SIM8	2
Total hours		40		10		0		20

SUBJECT MATTER CONTENT

LEC 1	Marine navigation safety system (4).
LEC 2	The watch under way (4).
SIM1	Keeping the navigational watch on the ship (4).
LEC 3	The watch in special conditions (4).
SIM2	Keeping the navigational watch in restricted areas (2).
EX1	Keeping navigational watch in difficult hydro-meteorological conditions (2).
EX2	Keeping the navigational watch in special situations (2).
LEC 4	Steering and sailing with conduct of vessel in any conditions of visibility (6).
SIM3	Keeping the navigational watch in areas with high traffic of ships (2).
EX3	Detection of collision situations at sea (2).
LEC 5	Steering and sailing with conduct of vessels in sight of one another (4).
SIM4	Keeping the navigational watch on waterways and traffic separation systems (2).
EX4	The use of radar in navigation in narrow passages (2).
LEC 6	Steering and sailing with conduct of vessels in restricted visibility (6).
SIM5	Keeping the navigational watch in foggy weather (4).
LEC 7	Light and ship signs according to COLREG requirements (4).
SIM6	Identification of nautical signs (2).
LEC 8	Sound and light signals of ships according to COLREG requirements (4).
SIM7	Identification of ship's signals (2).
LEC 9	Annexes to the COLREG regulations
SIM8	The technical requirements of lights and sound equipment (2).
EX5	Lights and shapes. Additional signals for fishing vessels fishing in close proximity. Technical details of sound signal appliances. Distress signals (2).

TEACHING AIDS

1	Notebook and multimedia projector.
2	Folios projector.
3	Whiteboard and colour felt-tips.
4	Nautical charts, triangles and dividers.
5	Nautical publications.
6	Pocket calculators.
7	Laboratory of navigation.
8	RADAR/ARPA-ECDIS/WECDIS Simulator.

METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)

F1	Written personal reports from laboratory tasks and exercises.
S1	Computational tasks.

F2	Written personal reports from laboratory tasks and exercises on navigational plot.								
S2	Comprehensive exercise on Simulator.								
S3	Final exam on navigation (theoretical questions, nautical calculations and keeping the navigational watch on Simulator).								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	0	0	0	70	0	70
<i>Lectures</i>							40		40
<i>Exercises</i>							10		10
<i>Laboratories</i>									0
<i>Simulator</i>							20		20
Student work:	0	0	0	0	0	0	70	0	70
<i>Preparation for classes</i>							70		70
TOTAL NUMBER OF HOURS	0	0	0	0	0	0	140	0	140
Number of ECTS points							6,5		6,5
LITERATURE									
Basic									
1	<i>International Regulations for Preventing Collisions at Sea.</i>								
2	Stavridis J.: <i>Watch Officer Guide</i> , Naval institute Press, Annapolis.								
Recommended									
1									
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Stanisław Kołaczyński, s.kolaczynski@amw.gdynia.pl								
2	Andrzej Królikowski, a.krolikowski@amw.gdynia.pl								

B.II.16 Ship manoeuvring

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Ship manoeuvring (O)							
2. Code of subject:								
3. Department:	Navigation and naval weapons							
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	VI							
10. Profile:	Practical							
11. Lecturer:	PhD Eng. Piotr Zwolan, PhD Eng. Mariusz Mięsikowski, MSc Eng. Paweł Pawłowski							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	The acquaintance with basic of ship manoeuvring in varying conditions.							
A2	The acquaintance with manoeuvring standards and requirements of the IMO.							
A3	The acquaintance with basics of ship's manoeuvring methods during mooring operations, anchoring, docking, MOB and rescue operation.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Basic knowledge on physics.							
2	Basic knowledge on electronics, electrical engineering and automation.							
3	Basic knowledge on mathematics (trigonometry, vector analysis, differential and integral calculus).							
LEARNING OUTCOMES								
LO1	Student knows real forces acting on a ship under different conditions.							
LO2	Student knows the behaviour of the ship in varying conditions.							
LO3	Student is familiarized with ship manoeuvring capabilities and components.							
LO4	Student knows and is able to use manoeuvring standards and requirements of the IMO.							
LO5	Student knows and is able to take into consideration the principles of ship handling.							
LO6	Student knows and is able to use man over board procedures.							
LO7	Student knows how to use lines, anchors, during mooring operations.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1-3	5						
LO2	LEC4	2						
LO3							SIM1	2
LO4	LEC5	2					SIM2	2
LO5	LEC6	2						
LO6	LEC7	2					SIM3	2

LO7	LEC8	2	EX1	2			SIM4, SIM5	5	
Total hours		15		2		0		11	
SUBJECT MATTER CONTENT									
LEC1	Introduction to lectures and principles of using FMB simulators (1).								
LEC2	Basic of ship manoeuvring (2).								
LEC3	The forces acting on a ship under different conditions (2).								
LEC4	The behaviour of the ship in varying conditions (2).								
SIM1	Basic ship manoeuvring, using various types of propulsion and manoeuvring systems (2).								
LEC5	Ship manoeuvring capabilities and components, standards and requirements of the IMO (2).								
SIM2	Determination of the manoeuvring and propulsion characteristics of common types of ships, with special reference to stopping distances and turning circles at various draughts and speeds (2).								
LEC6	Ship handling in special situation and heavy weather conditions (2).								
LEC7	Manoeuvres in situations of assists, MOB and rescue operation (2).								
SIM3	Methods of taking on board MOB or survivors from rescue boats and survival craft (2).								
LEC8	Use of anchors, lines during mooring operations, anchoring and docking (2).								
SIM4	Berthing and un-berthing under various conditions of wind (3).								
SIM5	Procedures for anchoring in deep water and in shallow water (2).								
EX1	Final exam on ship manoeuvring (2).								
TEACHING AIDS									
1	Notebook and multimedia projector.								
2	Folios projector.								
3	Whiteboard and colour felt-tips.								
4	IMO manoeuvring documentations.								
5	Pocket calculators.								
6	Laboratory of navigation system (FMB).								
7	RADAR/ARPA-ECDIS/WECDIS Simulator.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Written personal reports from simulation tasks and exercises (SIM2).								
F2	Mandatory participation in in all FMB simulations (SIM1 - SIM5).								
F3	Individual manoeuvring during MOB operation (SIM3).								
S1	Final exam on ship manoeuvring (theoretical questions, test).								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	0	0	0	28	0	28
<i>Lectures</i>							15		15
<i>Exercises</i>							2		2
<i>Laboratories</i>									0
<i>Simulator</i>							11		11
Student work:	0	0	0	0	0	0	28	0	28
<i>Preparation for classes</i>							28		28
TOTAL NUMBER OF HOURS	0	0	0	0	0	0	56	0	56
Number of ECTS points							1,5		1,5
LITERATURE									
Basic									

1	Bowditch N.: The American Practical Navigator. National Imagery And Mapping Agency, Bethesda (obsolete editions accessible also on Internet).
2	Admiralty Manual Of Navigation, Vol.1. The Stationery Office (TSO), London (obsolete editions accessible also on Internet).
Recommended	
1	Maritime Simulation and Training [on-line], Cork, Transas Home Page, 2016, http://www.transas.com/products/simulation (11.10.2016).
2	IMO Resolution A.601 (15) and A.751 (18).
3	Nowicki A.: Wiedza o manewrowaniu statkami morskimi, Trademar, Gdynia 1999.
4	Sobieszcański T.: Manewrowanie statkiem morskim, Gdynia 2009.
5	Wróbel F.: Vademecum nawigatora, TradeMar, Gdynia 2007.
LECTURER (NAME AND SURNAME, E-MAIL)	
1	Piotr Zwolan, p.zwolan@amw.gdynia.pl
2	Paweł Pawłowski, p.pawlowski@amw.gdynia.pl

3.1.3. Selective subjects

B.III.1 English language for mariners

B.III.2 Polish language

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Polish language (S)							
2. Code of subject:								
3. Department:	Language department							
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	I, II, III, IV, V, VI							
10. Profile:	Practical							
11. Lecturer:	MSc Beata Pierzyńska, MSc Barbara Czapczyńska							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	To understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment).							
A2	To communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters.							
A3	To describe in simple terms aspects of his/her background, immediate environment and matters in areas of immediate need.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	None.							
LEARNING OUTCOMES								
LO1	Has sufficient knowledge on the place and significance of foreign languages in the system of sciences and their subject-related characteristics.							
LO2	Is aware of the complexity nature of the language and changing nature of its notions.							
LO3	Possesses language skills characteristic of an independent user at level B2 and above as described in Common European Framework of Reference for Languages.							
LO4	Can seek for, analyze, assess and select data from a variety of sources.							
LO5	Is aware of his knowledge and skills, and necessity to constantly upgrade them in the context of his trade.							
LO6	Can work in a team, assuming various roles when participating in joint projects and discussion.							
LO7	Can upgrade and improve the acquired knowledge and skills.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	6	EX1- 55	194				
LO2								
LO3								
LO4								

LO5							
LO6							
LO7							
Total hours		6		194		0	0
SUBJECT MATTER CONTENT							
LEC1	Introduction (7).						
EX1	Alfabet i literowanie / Alphabet and spelling (3).						
EX2	Fonetyka języka polskiego / Phonetics (3).						
EX3	Dane osobowe, przedstawianie się / Personal data (3).						
EX4	Komunikacja w klasie / Classroom communication (3).						
EX5	Liczebniki główne 1-1000 / Cardinal numbers 1-1000 (3).						
EX6	Czasownik być / Verb „to be” (4).						
EX7	Nawiązywanie kontaktu / Meeting people (4).						
EX8	Czasownik mieć / Verb “to have” (4).						
EX9	Konstrukcja „to jest” z rzeczownikiem / This is plus noun (6).						
EX10	Podstawowe przymiotniki / Basic adjectives (6).						
EX11	Opis uczelni / Description of the College (3).						
EX12	Posiłki / Meals (6).						
EX13	Zakupy / Shopping (5).						
EX14	Podstawowe słownictwo wojskowe / Basic military vocabulary (9).						
EX15	Powtórzenie i utrwalenie wiadomości / Revision and Consolidation (6).						
EX16	Ocena postępów / Progress Evaluation (2).						
EX17	Czas teraźniejszy, koniugacja -m; -sz / Simple Present (4).						
EX18	Prezentacja: opisywanie siebie i innych / Description of a person (2).						
EX19	Czas teraźniejszy, koniugacja -ę; -isz; -ysz / Simple Present (4).						
EX20	W kawiarni, restauracji / In a cafe, restaurant (2).						
EX21	Zainteresowania / Interests and hobbies (2).						
EX22	Sklepy, zakupy (Biernik) / Shops, shopping (2).						
EX23	Rodzina (Narzędnik) / Family (2).						
EX24	Słownictwo wojskowe / Military vocabulary (6).						
EX25	Powtórzenie i utrwalenie wiadomości / Revision and Consolidation (2).						
EX26	Ocena postępów / Progress Evaluation (2).						
EX27	Rutyna dnia, dni tygodnia, godziny / Daily routine (5).						
EX28	Samopoczucie (jest mi zimno, chce mi się pić) / (3).						
EX29	Zapraszanie / Inviting people (4).						
EX30	Pogoda, pory roku, miesiące / Weather, seasons, months (3).						
EX31	Słownictwo wojskowe / Military vocabulary (6).						
EX32	Powtórzenie i utrwalenie wiadomości / Revision and Consolidation (2).						
EX33	Ocena postępów / Progress Evaluation (2).						
EX34	Zwiedzanie, lokalizacja / Sightseeing, locations (4).						
EX35	Pytania o opinię / Asking for opinion (4).						
EX36	Wyrażanie prośby o pomoc (Dopełniacz) / Asking for assistance (3).						
EX37	Uczucia i opinie pozytywne/negatywne / Positive/negative emotions (4).						
EX38	Umawianie się na spotkania / Meetings (3).						
EX39	Powtórzenie i utrwalenie wiadomości / Revision and Consolidation (2).						
EX40	Ocena postępów / Progress Evaluation (2).						
EX41	U lekarza (4).						
EX42	Wielkości i miary / Sizes and measurements (3).						

EX43	Opis domu / Description of accommodation (4).									
EX44	Pobył w hotelu / Staying at a hotel (4).									
EX45	Czas przeszły czasownika „być” / Simple Past (3).									
EX46	Powtórzenie i utrwalenie wiadomości / Revision and Consolidation (2).									
EX47	Ocena postępów / Progress Evaluation (2).									
EX48	Czas przeszły / Simple Past (8).									
EX49	Czas przyszły / Future tense (4).									
EX50	Podróże po Polsce i Europie / Travelling in Poland and Europe (6).									
EX51	Powtórzenie i utrwalenie wiadomości / Revision and Consolidation (2).									
EX52	Ocena postępów / Progress Evaluation (2).									
EX53	Biografia / Biography (4).									
EX54	Powtórzenie i utrwalenie wiadomości / Revision and Consolidation (2).									
EX55	Ocena postępów / Progress Evaluation (2).									
TEACHING AIDS										
1	Classware.									
2	Teacher's book.									
3	Recordings.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
S1	Average grade for progress attained (50%).									
S2	End of semester test (50%).									
STUDENT WORKLOAD										
Form of activity	Number of hours per semester									Total
	0	I	II	III	IV	V	VI	VII		
Contact hours:	0	74	28	28	28	28	14	0	200	
<i>Lectures</i>		1	1	1	1	1	1		6	
<i>Exercises</i>		73	27	27	27	27	13		194	
<i>Laboratories</i>									0	
<i>Simulator</i>									0	
Student work:	0	74	28	28	28	28	14	0	200	
<i>Preparation for classes</i>		74	28	28	28	28	14		200	
TOTAL NUMBER OF HOURS	0	148	56	56	56	56	28	0	400	
Number of ECTS points		6	2	2	2	2	1		15	
LITERATURE										
Basic										
1	Textbook – basic level.									
2	Workbook – basic level.									
3	www.e-polski.pl									
Recommended										
1										
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Beata Pierzyńska, b.pierzynska@amw.gdynia.pl									
2	Barbara Czapczyńska, b.czapczynska@amw.gdynia.pl									

B.III.3 Electrotechnics and marine electronics

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Electrotechnics and marine electronics (S)
2. Code of subject:	Eem
3. Department:	Mechanical and Electrical Engineering
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Major subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	III, IV
10. Profile:	Practical
11. Lecturer:	MSc Eng. Tomasz Piłat, Prof. Assoc. PhD Eng. Piotr Szymak
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	To familiarize students with the theory of electrostatic, magnetic fields and electromagnetic radiation.
A2	To familiarize students with basic elements of electrical circuits DC and AC, and electrical engineering fundamental laws.
A3	To familiarize students with three-phase circuits and main threats caused states of emergency.
A4	To acquaint students with operation of transformers, DC and AC machines and the main risks during working with electrical devices.
A5	To familiarize students with basic semiconductors elements.
A6	To acquaint students with basic analog circuits.
A7	To acquaint students with basic digital circuits.
A8	To acquire engineering skills of binary arithmetic.
A9	To familiarize students with general design of microprocessor.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	Knowledge of physics at the high school level.
2	In the field of mathematics: vector, differential, integral and operator calculus, complex numbers.
LEARNING OUTCOMES	
LO1	The student knows the basic concepts of the theory of electrostatic, magnetic fields and electromagnetic radiation and can describe the relationships between them.
LO2	The knowledge of the basic elements of electrical circuits DC and AC, and a description of electrical circuits using electrical engineering fundamental laws.
LO3	The ability to operating correctly in three-phase circuits and basic knowledge of the main threats caused states of emergency.
LO4	The knowledge about operation of transformers, DC and AC machines and identify basic of the main risks during working with electrical devices.
LO5	The student knows the structure, principles of operation, parameters and characteristics of the basic semiconductor devices: diodes, bipolar and unipolar transistor, LED photodiode and optocoupler.

LO6	The student knows the structure, principles of operation, parameters and characteristics of the basic analog circuits: operational amplifiers, sine and pulse generators.
LO7	The student knows the principles of operation and basic parameters of digital circuits: logic gates, latches, arithmetic logical unit, timers and registers.
LO8	The student is able to perform simple binary arithmetic operations.
LO9	The student knows the basic architecture of the microprocessor.

STRUCTURE OF SUBJECT

	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	1						
LO2	LEC2, LEC3	3			LAB1, LAB2	4		
LO3	LEC4, LEC5	3			LAB3	2		
LO4	LEC6-8	5	EX1	2	LAB4, LAB5	4		
LO5	LEC9	3			LAB6	2		
LO6	LEC10-12	5			LAB7	2		
LO7	LEC13	2			LAB8	2		
LO8	LEC13				LAB9	2		
LO9	LEC14	2	EX2	2	LAB10	2		
Total hours		24		4		20		0

SUBJECT MATTER CONTENT

LEC1	Survey of electrical engineering (1).
LEC2	Theory of Direct Current circuits (1).
LEC3	Theory of Alternating Current circuits (2).
LEC4	Theory of electromagnetic circuits (1).
LEC5	Electrical circuits analysis (3).
LEC6	DC and AC machinery (2).
LEC7	Electricity power generation and transmission (1).
LEC8	Transportation and industrial applications of electrical equipment (1).
LEC9	Semiconductor elements (3).
LEC10	Electronic amplifiers (2).
LEC11	Operational amplifiers (2).
LEC12	Generators (2).
LEC13	Fundamentals of digital circuits (2).
LEC14	Fundamentals of microprocessor (1).
EX1	Test I (2).
EX2	Test II (2).
LAB1	Safe operation with electricity and electrical systems. Electrical circuits laboratories: Examination Ohm's law, Examination I and II Kirchhoff laws (2).
LAB2	Electrical circuits laboratories: Examination series and parallel resonance of RLC circuits (2).
LAB3	Electrical circuits laboratories: Study of three-phase Y and Delta configurations circuits (2).
LAB4	Electrical machines laboratories: Examination of DC machines (motors and generators): series connection, shunt connection, compound connection, separately excited (2).

LAB5	Electrical machines laboratories: Examination of AC machines: asynchronous motors (cage motor, slip ring motor) and synchronous generators. Examination of parameters of transformers (2).								
LAB6	Measurement of static characteristics of diode (2).								
LAB7	Measurement of static characteristics of unipolar transistor (2).								
LAB8	Research on generators (2).								
LAB9	Research on operational amplifier (2).								
LAB10	Research on basic logical devices (2).								
TEACHING AIDS									
1	Lecture with multimedia presentation.								
2	Blackboard and coloured pens.								
3	Stands in laboratory of electrotechnics.								
4	Stands in laboratory of electronics.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Test (LO1 - LO9).								
F2	Oral answers.								
F3	Performing the computing task.								
S1	Test no. 1 (LO1 - LO4).								
S2	Test no. 2 (LO5 - LO9).								
S3	Pass the subject.								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	24	24	0	0	0	48
<i>Lectures</i>				12	12				24
<i>Exercises</i>				2	2				4
<i>Laboratories</i>				10	10				20
<i>Simulator</i>									0
Student work:	0	0	0	24	24	0	0	0	48
<i>Preparation for classes</i>				24	24				48
TOTAL NUMBER OF HOURS	0	0	0	48	48	0	0	0	96
Number of ECTS points				2	2				4
LITERATURE									
Basic									
1	<i>Presentations from lecturers given in PDF files.</i>								
2	Bishop O.: Electronic circuits and systems, Elsevier 2007.								
Recommended									
1	Hall T. D.: Practical Marine Electrical Knowledge, Witherby Publishers, Second Edition, London 1999.								
2	Malvino A.: Electronic Principles, McGraw-Hill Education - Europe, 8th Edition, 2015.								
3	Krakowski M.: Elektrotechnika teoretyczna. Obwody liniowe i nieliniowe. t. I, WNT 1995.								
4	Markiewicz A.: Zbiór zadań z elektrotechniki, Wydawnictwa Szkolne i Pedagogiczne, Warszawa 2010.								
5	Praca zbiorowa: Elektrotechnika i elektronika dla nieelektryków, WNT, Warszawa 1999.								
6	Rusek W., Pasierbiński J.: Elementy i układy elektroniczne w pytaniach i odpowiedziach, WNT, 2006.								
7	Kalisz J.: Podstawy techniki cyfrowej, WNT, 2002.								
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Tomasz Piłat, t.pilat@amw.gdynia.pl								

B.III.4 Automatics

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Automatics (S)							
2. Code of subject:								
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	V							
10. Profile:	Practical							
11. Lecturer:	Prof. Jerzy Garus, PhD Eng. Józef Małecki							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	The main goal of the course is to provide the students with basic tools in modelling, analysis and design linear feedback control systems.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	To understand the importance of automation in marine technology.							
LEARNING OUTCOMES								
LO1	Students will be able to know and understand the concepts related to automatics.							
LO2	Students will have knowledge to describe the behaviour of a control object and a control system in time and frequency domains.							
LO3	Students will be able to design and report the development of practical controllers in feedback control systems to achieve the desired behaviour of the system.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1, LEC2	3	EX4	2				
LO2	LEC3 - LEC6	7	EX1-EX3	6				
LO3					LAB1, LAB2	6		
Total hours		10		8		6		0
SUBJECT MATTER CONTENT								
LEC 1	Introduction to automatics (1).							
LEC 2	Modelling of a control system in time and frequency domains (2).							

LEC 3	Time and frequency responses (2).									
LEC 4	Reduction of multiple subsystem (1).									
LEC 5	Stability (2).									
LEC 6	Controllers (2).									
EX1	Laplace transform and transfer function (2).									
EX2	Routh-Hurwitz criterions (2).									
EX3	Block diagrams, signal flow graphs and Mason's law (2).									
EX4	Revision test (2).									
LAB 1	Time and frequency response techniques (3).									
LAB 2	Stability of control systems (3).									
TEACHING AIDS										
1	Lecture with multimedia presentation.									
2	Instruction.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
F1	Test (40%) (LO1 - LO3).									
F2	Students activity (exercise + laboratory) (60%) (LO2 - LO3).									
S1	Weighted Average Rating Factor $S1 = (0,4 F1 + 0,6 F2)$.									
STUDENT WORKLOAD										
Form of activity	Number of hours per semester									Total
	0	I	II	III	IV	V	VI	VII		
Contact hours:	0	0	0	0	0	24	0	0	24	
<i>Lectures</i>						10			10	
<i>Exercises</i>						8			8	
<i>Laboratories</i>						6			6	
<i>Simulator</i>									0	
Student work:	0	0	0	0	0	24	0	0	24	
<i>Preparation for classes</i>						24			24	
TOTAL NUMBER OF HOURS	0	0	0	0	0	48	0	0	48	
Number of ECTS points						2			2	
LITERATURE										
Basic										
1	Handbook of Automation, Editor: Shimon Y. Nof, Springer-Verlag Berlin Heidelberg 2009.									
2	Mono- and Multivariable Control and Estimation, editor: Claus Hillermeier, Munich, Germany, 2011.									
Recommended										
1	Advances in Industrial Control, Béla Lanto, Lorinc Márton, Springer-Verlag London Limited 2011.									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Jerzy Garus, j.garus@amw.gdynia.pl									

B.III.5 Geographical information systems

B.III.6 Informatics

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Informatics (S)							
2. Code of subject:	Inf							
3. Department:	Department of Computer Science							
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	V, VI							
10. Profile:	Practical							
11. Lecturer:	PhD Eng. Patrycja Trojczak, PhD Eng. Artur Zacniewski							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	To teach how to use Excel.							
A2	To teach how Excel may be used to solve computational problems.							
A3	To teach how to create simple website.							
A4	To teach basics of World Wide Web.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Students should know basic rules of using computer.							
2	Students should know fundamentals of mathematics.							
LEARNING OUTCOMES								
LO1	The student knows the capabilities of Excel.							
LO2	Using Excel the student is able to project solution of selected computational problems.							
LO3	The student is aware of the impact of IT technology development on human activity.							
LO4	The student knows how World Wide Web can be useful in few areas of their activity.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1			EX1, EX2	4				
LO2					LAB1-4	16		
LO3					LAB5	4		
LO4					LAB6-10	20		
Total hours		0		4		40		0
SUBJECT MATTER CONTENT								
EX1	Rules of using program Excel 2016.							
EX2	Rules of using formulas, boolean expressions.							

LAB 1	The specificity of computing problems.									
LAB 2	Data, forms of data, navigations in worksheet.									
LAB 3	Sorting, ranges, printing, organisation of worksheet.									
LAB 4	Charts, tables, import/export data.									
LAB 5	Solving selected computational problems.									
LAB 6	Creating simple website with website building platform.									
LAB 7	Adding and formatting text with website building platform.									
LAB 8	Adding pictures and buttons with website building platform.									
LAB 9	Adding miscellaneous content with website building platform.									
LAB 10	Adding miscellaneous content with website building platform - final project.									
TEACHING AIDS										
1	Computers with Microsoft Office 2016 Multilanguage and access to Internet.									
2	Access to www.zbrojownia.amw.gdynia.pl									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
S1	Average (from LAB1 to LAB5).									
S2	Average (from LAB6 to LAB10).									
STUDENT WORKLOAD										
Form of activity	Number of hours per semester									Total
	0	I	II	III	IV	V	VI	VII		
Contact hours:	0	0	0	0	0	24	20	0	44	
<i>Lectures</i>									0	
<i>Exercises</i>						4			4	
<i>Laboratories</i>						20	20		40	
<i>Simulator</i>									0	
Student work:	0	0	0	0	0	24	20	0	44	
<i>Preparation for classes</i>						24	20		44	
TOTAL NUMBER OF HOURS	0	0	0	0	0	48	40	0	88	
Number of ECTS points						2	2		4	
LITERATURE										
Basic										
1	Microsoft Excel. Data analysis and Business Modelling, http://down.cenet.org.cn/upfile/21/200512512652138.pdf									
2	Walkenbach J.: Excel 2016 Bible, John Wiley & Sons.									
Recommended										
1	Tutorials, http://www.skilledup.com/articles/free-excel-tutorials									
2	Tutorials, https://support.wix.com/en/getting-started/templates									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Patrycja Trojczak, p.trojczak@amw.gdynia.pl									
2	Artur Zacniewski, a.zacniewski@amw.gdynia.pl									

B.III.7 Marine power plants

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Marine power plants (S)							
2. Code of subject:								
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	VI							
10. Profile:	Practical							
11. Lecturer:	Prof. Assoc. Andrzej Grządziela							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	To teach students about the construction and operation of mechanisms and devices included in the typical power plants on board of vessels and warships.							
A2	To familiarize students with basic marine power systems.							
A3	To teach students about basic aspects of cooperation of ship hull and propulsion system.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Knowledge of physics at medium level.							
2	Knowledge of differential equations.							
3	Knowledge of material strength and material science.							
LEARNING OUTCOMES								
LO1	The student knows the classification and distribution of marine power plants.							
LO2	The student knows the structure, functions and principle of work of piston engines and turbine engines.							
LO3	The student knows the structure and purpose of the basic hull and engine room installations.							
LO4	The student knows the principles of cooperation of engine - propeller and propeller - hull.							
LO5	The student knows the purpose and operation of auxiliary machinery such as pumps, compressors, centrifuges, incinerators, oil separators, filters and heat exchangers.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1,	2						
LO2	LEC2, LEC3	4	EX2	2	LAB1	2		
LO3	LEC5, LEC6	4	EX1	2				
LO4	LEC4	2	EX3	1				
LO5	LEC7, LEC8	3			LAB2, LAB3	3		

Total hours		15		5		5		0	
SUBJECT MATTER CONTENT									
LEC 1	Classification and distribution of marine power plants (2).								
LEC 2	Structure, functions and principle of work of piston engines (2).								
LEC 3	Structure, functions and principle of work of turbine engines (2).								
LEC 4	Cooperation of main engine - propeller and propeller - hull (2).								
LEC 5	Structure and purpose of the basic hull installations (2).								
LEC 6	Structure and purpose of the engine room installations (2).								
LEC 7	Purpose and operation of pumps, compressors, centrifuges, incinerators (2).								
LEC 8	Purpose and operation of oil separators, filters and heat exchangers (1).								
EX1	Cooperation of main engine - propeller and propeller - hull characteristics (2).								
EX2	Piston engines and turbine engines - characteristics (2).								
EX3	Basic hull installations - schemes (1).								
LAB 1	Operating of piston engines and turbine engines (2).								
LAB 2	Operating of pumps and compressors (2).								
LAB 3	Operating of oil separators and incinerators (1).								
TEACHING AIDS									
1	Lecture with multimedia presentation.								
2	Schemes of installations.								
3	Laboratory equipment.								
4	Equipment instructions.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Test (50%) (LO1 - LO5).								
F2	Students activity (20%) (LO2 - LO4).								
F3	Laboratories reports (30%).								
S1	Weighted Average Rating Factor $S1 = (0,5 F1 + 0,2 F2 + 0,3 F3)$.								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	0	0	0	25	0	25
<i>Lectures</i>							15		15
<i>Exercises</i>							5		5
<i>Laboratories</i>							5		5
<i>Simulator</i>									0
Student work:	0	0	0	0	0	0	25	0	25
<i>Preparation for classes</i>							25		25
TOTAL NUMBER OF HOURS	0	0	0	0	0	0	50	0	50
Number of ECTS points							2		2
LITERATURE									
Basic									

1	Bennett S.: Modern Diesel Technology: Diesel Engines, Cengage Learning, Delmar 2010.
2	Woodyard D.: Marine Diesel Engines and Gas Turbines. Eighth edition.
3	Carlton J.S.: Marine Propellers and Propulsion. Second edition. 2007.
Recommended	
1	Charchalis A.: Siłownie okrętowe, WSMW, Gdynia 1980.
2	Charchalis A.: Opory okrętów wojennych i pędniki okrętowe, AMW, Gdynia 2001.
3	Girtler J.: Siłownie okrętowe dla elektryków cz. 3. Okrętowe maszyny i urządzenia pomocnicze.
4	Wojnowski W.: Okrętowe siłownie okrętowe cz I, II, III.
LECTURER (NAME AND SURNAME, E-MAIL)	
1	Andrzej Grządziela, a.grzadziela@amw.gdynia.pl

3.2. MODULE OF SPECIALTY SUBJECTS

3.2.1. Common subjects

C.I.1 Academic information systems

Number of hours

Semester	Number of hours								Obligatory / selected	Requirements	ECTS points
				contact hours according to type							
	contact	preparation	total	lectures	exercises	laboratories	simulators	total			
0	0	0	0					0			
I	8	0	8	8				8	0	Cg	0,5
II	0	0	0					0			
III	0	0	0					0			
IV	0	0	0					0			
V	0	0	0					0			
VI	0	0	0					0			
VII	0	0	0					0			
Ogółem	8	0	8	8	0	0	0	8			0,5

Study contents

Users management in academic net. Fundamentals of computer nets (including wireless). Services in internet. Ways of communication in the Polish Naval Academy.

Learning outcomes

After completing the course the student has general knowledge about academic computer system construction and activity academic nets. Is able to log and work in Windows. Knows rules of user management and his rights. Is able to select and use proper net service. Knows most common electronic ways of communication in PNA and is aware of the impact of IT technology development on academic activity.

C.I.2 Information technology

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Information technology (O)							
2. Code of subject:								
3. Department:	Department of Computer Science							
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Specialty subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	I							
10. Profile:	Practical							
11. Lecturer:	PhD Eng. Przemysław Rodwald							
12. Date of update:	10 March, 2018							
<i>* O/S – obligatory / selective</i>								
AIM OF SUBJECT								
A1	To teach basic concepts of IT and security of computer systems.							
A2	To teach how to create basic document.							
A3	To teach how to create basic presentation.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Students should know basic rules of using computer.							
2	Students should know fundamentals of mathematics.							
LEARNING OUTCOMES								
LO1	The student has general knowledge about IT and security issues.							
LO2	The student is able to create a document in Microsoft Word.							
LO3	The student is able to create a presentation in Microsoft PowerPoint.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1-4	4						
LO2	LEC5	3	EX1, EX2	3	LAB1, LAB2	8		
LO3	LEC6	3	EX3, EX4	2	LAB3, LAB4	7		
Total hours		10		5		15		0
SUBJECT MATTER CONTENT								
LEC1	Introduction (1).							
LEC2	Information technology (1).							
LEC3	Data representation (1).							
LEC4	Computer security (1).							
LEC5	Microsoft Word (3).							
LEC6	Microsoft PowerPoint (3).							
EX1	Microsoft Word - basic document (1).							
EX2	Microsoft Word - advanced document (2).							

EX3	Microsoft PowerPoint - basic presentation (1).									
EX4	Microsoft PowerPoint - advanced presentation (1).									
LAB1	Microsoft Word - basic document (3).									
LAB2	Microsoft Word - advanced document (5).									
LAB3	Microsoft PowerPoint - basic presentation (3).									
LAB4	Microsoft PowerPoint - advanced presentation (4).									
TEACHING AIDS										
1	Lectures with multimedia presentation.									
2	Computers with Microsoft Office 2013 EN and access to Internet.									
3	Access to www.zbrojownia.amw.gdynia.pl									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
S1	Final test.									
S2	Average (from LAB1 to LAB4).									
STUDENT WORKLOAD										
Form of activity		Number of hours per semester								Total
		0	I	II	III	IV	V	VI	VII	
Contact hours:		0	30	0	0	0	0	0	0	30
<i>Lectures</i>			10							10
<i>Exercises</i>			5							5
<i>Laboratories</i>			15							15
<i>Simulator</i>										0
Student work:		0	30	0	0	0	0	0	0	30
<i>Preparation for classes</i>			30							30
TOTAL NUMBER OF HOURS		0	60	0	0	0	0	0	0	60
Number of ECTS points			2,5							2,5
LITERATURE										
Basic										
1	Microsoft Word 2013 Step by Step, http://it-ebooks.info/book/2207/									
2	Microsoft PowerPoint 2013 Step by Step, http://it-ebooks.info/book/2206/									
Recommended										
1	Microsoft Word 2013 Plain & Simple, http://it-ebooks.info/book/2105/									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Przemysław Rodwald, p.rodwald@amw.gdynia.pl									

C.I.3 Legal system in Poland and academic regulations

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Legal system in Poland and academic regulations (O)							
2. Code of subject:								
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Specialty subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	I							
10. Profile:	Practical							
11. Lecturer:	PhD Alicja Żukowska							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	To know basics of Polish law.							
A2	To acquire knowledge about academic regulations in Polish Naval Academy.							
A3	To develop general knowledge about Poland.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Ability to work in group.							
LEARNING OUTCOMES								
LO1	Student possesses knowledge on sources of law in Poland and understands the consequences of division of legal norms.							
LO2	Student knows main natural person's rights and obligation under the Polish law.							
LO3	Student is able to refer to statutes and regulations referring to the conduct of education in Polish Naval Academy.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1-3	12						
LO2	LEC4, LEC5	4						
LO3			EX1	4				
Total hours		16		4		0		0
SUBJECT MATTER CONTENT								
LEC1	Understanding European approach to the law, scope of the term law, legal norms and its kinds.							
LEC2	Introduction to Polish Constitution, rights and duties of citizen and foreigner.							
LEC3	Introduction to Polish civil law, subjects of law, personal goods, contracts							

LEC4	Introduction to Polish penal law - crimes, penalties, procedure.									
LEC5	Introduction to Polish administrative law - substantial and procedural law.									
EX1	Academic regulations in Polish Naval Academy, rights and duties of a student, administrative aspects of studying.									
TEACHING AIDS										
1	Lecture with multimedia presentation.									
2	Instruction.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
S1	Students activity (evaluative assessment).									
STUDENT WORKLOAD										
Form of activity		Number of hours per semester								Total
		0	I	II	III	IV	V	VI	VII	
Contact hours:		0	20	0	0	0	0	0	0	20
<i>Lectures</i>			16							16
<i>Exercises</i>			4							4
<i>Laboratories</i>										0
<i>Simulator</i>										0
Student work:		0	20	0	0	0	0	0	0	20
<i>Preparation for classes</i>			20							20
TOTAL NUMBER OF HOURS		0	40	0	0	0	0	0	0	40
Number of ECTS points			2							2
LITERATURE										
Basic										
1	Wyrozumska A.: Introduction to Polish Law.									
Recommended										
1	Jablonska-Bonca J.: Wprowadzenie do prawa.									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Alicja Żukowska, a.zukowska@amw.gdynia.pl									
2	Patrycja Trojczak, p.trojczak@amw.gdynia.pl									

C.I.4 Seamanship

I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	Seamanship (O)
2. Code of subject:	Xo
3. Department:	
4. Major:	Navigation
5. Specialty:	Maritime navigation
6. Module:	Specialty subjects
7. Level of education:	First-degree studies
8. Form of education:	Full-time studies
9. Semester:	II
10. Profile:	Practical
11. Lecturer:	MSc Mateusz Kot
12. Date of update:	10 March, 2018
* O/S – obligatory / selective	
AIM OF SUBJECT	
A1	Familiarize students with basic ship construction.
A2	Familiarize students with naval terminology and nomenclature concerning types and construction of vessels.
A3	Familiarize students with various vessel types.
A4	Familiarize students with main ship parameters.
A5	Familiarize students with the essence of vessel classification.
A6	Familiarize students with types and purpose of ship ropes and deck equipment.
A7	Familiarize students with types, building rules, and usage of deck equipment.
A8	Familiarize students with types and purpose of deck equipment.
A9	Familiarize students with convention requirements for deck equipment.
A10	Familiarize students with access equipment for vertical and horizontal loading ships.
A11	Familiarize students with lifesaving appliances and methods of launching lifeboats and rafts.
A12	Familiarize students with methods and equipment of replenishment at sea.
A13	Familiarize students with customs, traditions and etiquette of navy, merchant and passenger fleet.
A14	Familiarize students with deck equipment usage problems.
A15	Familiarize students with rules of vessel maintenance and dry docking.
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES	
1	High school level knowledge of physics.
2	Basic knowledge of electrical engineering.
3	Basic knowledge of vector calculus.
LEARNING OUTCOMES	
LO1	Student is able to correctly characterise all basic types of vessels.
LO2	Student is able to enumerate main classification societies and discuss their activity.
LO3	Student knows well maritime nomenclature concerning vessels build and construction. Moreover, student is able to define main ship dimensions.
LO4	Student knows cargo gear of vessels. Moreover, student is able to use properly deck equipment and knows rules of usage of lifting appliance.

LO5	Student knows types of cargo access equipment for vertical and horizontal loading ships. Moreover, student knows requirements of classification societies for hatch covers.
LO6	Student is able to enumerate types of deck equipment and discuss their construction and usage. Moreover, student knows convention requirements for deck equipment.
LO7	Student is able to enumerate lifesaving appliances and personal safety gear. Moreover, student is able to discuss convention requirements, purpose, and usage of lifesaving appliances and personal safety gear.
LO8	Student is able to discuss methods of replenishment at sea and knows gear used during RAS.
LO9	Students is able to discuss maritime customs and etiquette. Moreover, student knows basic maritime habits and traditions.
LO10	Student knows principle of operation, build and usage of windlass.
LO11	Student knows types and purpose of deck equipment. Moreover, student knows steering, anchoring, mooring and cargo gear.
LO12	Student knows types and purpose of steering gear, rules of inducing forces on a rudder, build of electrohydraulic steering gear, classification societies regulations concerning steering gear, usage rules of steering gear.
LO13	Student is able to discuss rules of examination of technical state, and withdrawal from service of deck equipment.

STRUCTURE OF SUBJECT

	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	2						
LO2	LEC2	2						
LO3	LEC3	1						
LO4	LEC4	0,5	EX1	4				
LO5	LEC5	1						
LO6	LEC6	1	EX2	5				
LO7	LEC7	2	EX3	4				
LO8	LEC8	1	EX4	3				
LO9	LEC9	2	EX5	3				
LO10	LEC5	1						
LO11	LEC6	0,5						
LO12	LEC6	0,5						
LO13	LEC4	0,5						
			EX6	2				
Total hours		15		21		0		0

SUBJECT MATTER CONTENT

LEC1	An introduction to the course. The importance of maritime knowledge in the education of future officers (2).
LEC2	Characteristic of vessels. Classification societies. Classification of vessels according to PRS (2).
LEC3	Nomenclature of a ship constituent parts hull, deck, superstructures, sails and rigs. Main dimensions of a vessel (1).
LEC4	Cargo gear of a ship. Ropes, deck equipment, lifting appliances (1).
EX1	Cargo gear of a vessel (4).
LEC5	Access equipment for vertical and horizontal loading ships (2).
LEC6	Deck equipment. Steering, anchoring, mooring and towing gear (2).
EX2	Steering, anchoring and mooring gear installed on vessels (5).

LEC7	Lifesaving appliances of a ship. Launching appliances for rescue boats and rafts (2).									
EX3	Usage of ship lifesaving appliances (4).									
LEC8	Replenishment at sea. Methods of replenishment at sea. Replenishment at sea equipment. Replenishment at sea from specially equipped merchant ship (1).									
EX4	Demonstration of RAS equipment (3).									
LEC9	Conducting maintenance of a ship. Dry docking (2).									
EX5	Maritime customs, traditions and etiquette (3).									
EX6	Test (2).									
TEACHING AIDS										
1	Notebook with projector. Powerpoint presentation.									
2	Whiteboard and markers.									
3	Ship general arrangement plans.									
4	Lifesaving appliances.									
5	Dry Dock Documentation.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
F1	Written test (LO3, LO11, LO13).									
F2	Oral exam (LO1, LO2, LO5, LO7, LO8, LO9, LO10, LO12).									
F3	Exercise (LO4, LO6, LO7, LO8, LO9).									
S1	Written exam.									
STUDENT WORKLOAD										
Form of activity	Number of hours per semester									Total
	0	I	II	III	IV	V	VI	VII	0	
Contact hours:	0	0	36	0	0	0	0	0	0	36
<i>Lectures</i>			15							15
<i>Exercises</i>			21							21
<i>Laboratories</i>										0
<i>Simulator</i>										0
Student work:	0	0	36	0	0	0	0	0	0	36
<i>Preparation for classes</i>			36							36
TOTAL NUMBER OF HOURS	0	0	72	0	0	0	0	0	0	72
Number of ECTS points			3							3
LITERATURE										
Basic										
1	Dokkum – Ship knowledge. Dokmar, 2008.									
2	ATP-16 (D).									
3	Testing and Evaluation of Life-Saving Appliances IMO London, 2003.									
4	SOLAS Consolidated Edition 2009.									
5	Naval Services FamilyLine 2006.									
6	Social Customs and Traditions of the Sea Services, NS FamilyLine, DC 2006.									
7	International Life-Saving Appliance Code. IMO London, 2003.									
8	Manual of seamanship, HMSO, London 1995.									
9	Buxton, Daggitt, King - Cargo Access Equipment for Merchant Ships, London 1978.									
10	The mariner's handbook - UKHO, Taunton 2004.									
Recommended										
1										
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Mateusz Kot									

C.I.5 Radar systems fundamentals and operation principles

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Radar systems fundamentals and operation principles (O)							
2. Code of subject:	Qlr							
3. Department:	Laboratory of Maritime Communication and Radiolocation							
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Specialty subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	IV							
10. Profile:	Practical							
11. Lecturer:	PhD Eng. Piotr Bekier							
12. Date of update:	10 March, 2018							
<i>* O/S – obligatory / selective</i>								
AIM OF SUBJECT								
A1	To teach the basics about EM wave and EM wave reflection.							
A2	To teach the types of radars and differences between them, methods of radiolocation and coordinates measurement.							
A3	To teach the radar structure and principles of radar operation.							
A4	To teach the tactical parameters of radar and their dependences on technical parameters.							
A5	To teach how to use the navigational radars in practical operations.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Students have basic knowledge and ability to use computer.							
2	Students have basic knowledge on physics laws and mathematics.							
LEARNING OUTCOMES								
LO1	Demonstrate the knowledge of physical properties related to the radiolocation.							
LO2	Demonstrate the knowledge of radar classifications, methods of radiolocation and methods of coordinates measurement.							
LO3	Demonstrate the knowledge of radar structure and its principles of operation.							
LO4	Demonstrate the knowledge of tactical radar parameters and ability to make some basic calculations.							
LO5	Demonstrate the ability to use navigational radars in practical operations.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1-3	4						
LO2	LEC4, LEC5	4						
LO3	LEC6	6						
LO4	LEC7	2	EX1	2				
LO5			EX2	1	LAB1	13		
Total hours		16		3		13		0

SUBJECT MATTER CONTENT										
LEC1	Introduction (1).									
LEC2	Fundamentals about EM waves (2).									
LEC3	EM wave reflection, the RCS (1).									
LEC4	Classification of radars, methods of radiolocation (2).									
LEC5	Methods of coordinates measurement (2).									
LEC6	Radar structure and principles of operation (6).									
LEC7	The tactical parameters of radar (2).									
EX1	Calculation of radar maximum and minimum detection range, range and bearing resolution (2).									
EX2	Preparing navigational radar to use (1).									
LAB1	Practical operations of the navigational radars (13).									
TEACHING AIDS										
1	Computer with multimedia projector.									
2	Calculators.									
3	Training Simulator of Marine Radar Systems.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
S1	Written test.									
S2	Positive result of practical test during the labs at the Training Simulator of Marine Radar Systems.									
STUDENT WORKLOAD										
Form of activity	Number of hours per semester									Total
	0	I	II	III	IV	V	VI	VII		
Contact hours:	0	0	0	0	32	0	0	0	32	
<i>Lectures</i>					16				16	
<i>Exercises</i>					3				3	
<i>Laboratories</i>					13				13	
<i>Simulator</i>									0	
Student work:	0	0	0	0	32	0	0	0	32	
<i>Preparation for classes</i>					32				32	
TOTAL NUMBER OF HOURS	0	0	0	0	64	0	0	0	64	
Number of ECTS points					3				3	
LITERATURE										
Basic										
1	Skolnik M.: <i>Radar Handbook</i> , McGraw-Hill, New York, 2008.									
2	Sharma K. K.: <i>Introduction to radar systems</i> , S.K. Kataria & Sons, New Delhi, 2015.									
Recommended										
1	Burch D.: <i>Radar for Mariners</i> , International Marine Publishing, 2013.									
LECTURER (NAME AND SURNAME, E-MAIL)										
1	Piotr Bekier, p.bekier@amw.gdynia.pl									

C.I.6 Tactical navigation

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Tactical navigation (O)							
2. Code of subject:								
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Specialty subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	IV							
10. Profile:	Practical							
11. Lecturer:	Prof. Assoc. PhD Eng. Mariusz Wąż							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	The acquaintance with manoeuvring board manual.							
A2	The acquaintance with manoeuver to change the distance.							
A3	The acquaintance with manoeuver to change the position.							
A4	The acquaintance with methods of search ships target.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Basic knowledge on trigonometry.							
2	Basic knowledge on vector analysis.							
3	Basic knowledge on physics.							
LEARNING OUTCOMES								
LO1	Student knows basics manoeuvring board manual.							
LO2	Student know how calculate closest point of approach.							
LO3	Student knows and is able to carry the manoeuver to change the distance.							
LO4	Student knows and is able to carry the manoeuver to change the position.							
LO5	Student knows and is able to search ships target.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	2	EX1	1				
LO2	LEC2	1	EX2	2				
LO3	LEC3	1	EX3	1				
LO4	LEC4, LEC5	4	EX4, EX5	3				
LO5	LEC6	2	EX6	1				
Total hours		10		8		0		0
SUBJECT MATTER CONTENT								

LEC 1	Manoeuvring to change the distance (2).										
EX1	Calculate course and speed to pass another ship at a specified distance (1).										
LEC 2	Manoeuvring to close to the minimum distance (1).										
EX2	Calculate course at specified speed to pass another ship at maximum and minimum distances (2).										
EX3	Calculate course and speed between two stations, remaining within a specified range for specified time interval enroute (1).										
LEC 3	Course at maximum speed to open range to a specified distance in minimum time (1).										
LEC 4	Manoeuvring to change the position (2).										
EX4	Calculate course and speed to maintain the location ships after changing target's course (1).										
LEC 5	Course, speed, and position derived from bearings only (2).										
EX5	Calculate course, speed, and position derived from bearings only (2).										
LEC 6	Manoeuvring to search ships target (2).										
EX6	Computational task (1).										
TEACHING AIDS											
1	Notebook and multimedia projector.										
2	Folios projector.										
3	Whiteboard and colour felt-tips.										
4	Manoeuvring boards.										
5	RADAR/ARPA-ECDIS/WECDIS Simulator.										
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)											
F1	Written personal reports from exercises (EX1-5).										
S1	Computational task (EX6).										
STUDENT WORKLOAD											
Form of activity	Number of hours per semester										Total
	0	I	II	III	IV	V	VI	VII			
Contact hours:	0	0	0	0	18	0	0	0	0	18	
<i>Lectures</i>					10					10	
<i>Exercises</i>					8					8	
<i>Laboratories</i>										0	
<i>Simulator</i>										0	
Student work:	0	0	0	0	18	0	0	0	0	18	
<i>Preparation for classes</i>					18					18	
TOTAL NUMBER OF HOURS	0	0	0	0	36	0	0	0	0	36	
Number of ECTS points					1,5					1,5	
LITERATURE											
Basic											
1	Radar navigation and manoeuvring board manual; USA Maritime Safety Information Center National Imagery and Mapping Agency, 2001.										
Recommended											
1	Basiński E., Posiła J.: Nawigacja taktyczna, Podręcznik, Mar. Woj., Gdynia 1980.										
2	Wojewoda W., Drobniowski W.: Nawigacja taktyczna. Nakresy manewrowe. WSMW, Gdynia 1986.										
LECTURER (NAME AND SURNAME, E-MAIL)											
1	Mariusz Wąż, m.waz@amw.gdynia.pl										

3.2.2. Selective subjects

C.II.1 Fundamentals of international public law

C.II.2 Fundamentals of machine design and engineering drawing

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Fundamentals of machine design and engineering drawing (S)							
2. Code of subject:								
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Major subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	II							
10. Profile:	Practical							
11. Lecturer:	MSc Marek Dudziński							
12. Date of update:	10 March, 2018							
<i>* O/S – obligatory / selective</i>								
AIM OF SUBJECT								
A1	The main objective of this course is to provides rules for the design of general-purpose machine elements.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	After the successful completion of the course, the student shall be able to cover the most important steps of the analysis stage of the design process. Further goal of the course is to help students to understand mechanical engineering problems that they can meet in the future in their service area.							
LEARNING OUTCOMES								
LO1	Gain knowledge by student about the basics of machine design, including the design process, engineering mechanics and materials, failure prevention under static and variable loading, and characteristics of the principal types of mechanical elements.							
LO2	Acquire practical approach to the subject through the laboratory test and experiments.							
LO3	Acquire practical approach to the subject through the numerical examples.							
LO4	Acquire practical approach to the subject through using of real-world applications.							
LO5	Ability to work in group and solving basic engineering design task.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1-LEC6	18						
LO2			EX1	3				
LO3			EX2, EX3	6				
LO4			EX4, EX5	6				
LO5			EX6	3				
Total hours		18		18		0		0
SUBJECT MATTER CONTENT								

LEC 1	Engineering. Basic, derived and compound metric units. Engineering Materials. Corrosion. Vectors. Scales and graphs. Mechanisms. Forces in engineering. Gravity. Friction and lubrication. Levers and Beams (3).									
LEC 2	Stress and Strain. Factor of safety. Fatigue Analysis (3).									
LEC 3	Ideal and practical machines. Connections - bolted, welded, shaft-hub, press-fit. Shafting, couplings, clutches, brakes, roller contact and journal bearings. Transmission systems (3).									
LEC 4	Mechanical Drawings (3).									
LEC 5	Computer Aided Design (3).									
LEC 6	Computer Aided Engineering (3).									
EX1	Stress-rupture test and determination of material constants (3).									
EX2	Solving numerical problems from mechanics and strength of materials (3).									
EX3	Solving numerical problems from practical machines (3).									
EX4	Mechanical Drawings tutorials (3).									
EX5	Using of computational software in mechanical design and analysis (3).									
EX6	Solving fundamental design task (3).									
TEACHING AIDS										
1	Lecture with multimedia presentation.									
2	Mechanical engineering laboratory.									
3	Exercises in class room.									
4	Computer laboratory.									
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)										
F1	Design test (60%) (LO1 - LO5).									
F2	Students activity (40%) (LO1 - LO3).									
S1	Weighted Average Rating Factor $S1 = (0,6 F1 + 0,4 F2)$.									
STUDENT WORKLOAD										
Form of activity	Number of hours per semester									Total
	0	I	II	III	IV	V	VI	VII		
Contact hours:	0	0	36	0	0	0	0	0	0	36
<i>Lectures</i>			18							18
<i>Exercises</i>			18							18
<i>Laboratories</i>										0
<i>Simulator</i>										0
Student work:	0	0	36	0	0	0	0	0	0	36
<i>Preparation for classes</i>			36							36
TOTAL NUMBER OF HOURS	0	0	72	0	0	0	0	0	0	72
Number of ECTS points			3							3
LITERATURE										
Basic										
1	Budynas R.G., Nisbett J.K.: Mechanical Engineering Design, McGrawHill, Warszawa 2015.									
Recommended										
1	Dietrich M.: Podstawy konstrukcji maszyn, WNT, Warszawa 2015.									
2	Glendinning E. H.: English in Focus. English in Mechanical Engineering 14th, Oxford University Press, USA 1974.									
3	Jaskulski A.: Autodesk Inventor 10PL/10+: metodyka projektowania, Mikom, Warszawa 2006.									
4	Kochanowski M.: Podstawy konstrukcji maszyn z rysunkiem technicznym, PG, Gdańsk 1998.									
5	Poradnik mechanika, Wydawnictwo REA, Warszawa 2009.									

LECTURER (NAME AND SURNAME, E-MAIL)	
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1	Marek Dudziński, m.dudzinski@amw.gdynia.pl
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C.II.3 Marine hydrography

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Marine hydrography (S)							
2. Code of subject:								
3. Department:								
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Specialty subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	VI							
10. Profile:	Practical							
11. Lecturer:	PhD Eng. Karolina Zwolak, MSc Eng. Artur Grządziel, PhD Eng. Henryk Nitner, Prof. Assoc. Artur Makar							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	To familiarize students with methods of the hydrographic data collection, critical to the safety of navigation.							
A2	To provide student with the ability of hydrographic data accuracy assessment.							
A3	To provide students with the understanding of hydrographic infrastructure planning and use.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Extensive knowledge of mathematics and physics.							
2	Fluently on computer technology.							
3	Awareness of seamanship basics.							
4	Basics of navigation and geodesy.							
LEARNING OUTCOMES								
LO1	Student understands the role and importance of marine hydrography.							
LO2	Student is aware of the basics of local and international regulations regarding hydrographic surveying.							
LO3	Student understands the techniques of positioning and accompanying works during surveying.							
LO4	Student is familiar with the hydrographic equipment, its purpose and ways of use.							
LO5	Student knows the basics of hydrographic data processing.							
LO6	Student is able to work with and create the surveying documentation.							
LO7	Students understand the process of navigational aids establishing based on hydrographic information.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	1						
LO2	LEC2	1						
LO2	LEC3	2						
LO3	LEC4	2						

LO4	LEC5	2	EX1	2				
LO4	LEC6	2	EX2	2	LAB1	2		
LO4	LEC7	2			LAB2	2		
LO4	LEC8	2						
LO5	LEC9	2			LAB3	4		
LO6	LEC10	2	EX3	2				
LO7	LEC11	2	EX4	2				
Total hours		20		8		8		0

SUBJECT MATTER CONTENT

LEC1	Introduction to lectures. The importance of hydrography.
LEC2	Organization of Hydrographic Services in Poland and worldwide.
LEC3	Hydrographic surveys - types of works, general requirements.
LEC4	Survey vessels - types, roles, equipment. Positioning during survey.
LEC5	Multibeam echosounder - construction, theory of operation, survey planning and conducting.
EX1	Planning the survey with multibeam echosounder.
LEC6	Side scan sonar and scanning sonar - construction, theory of operation, survey planning and conducting.
EX2	Planning the survey with side scan sonar.
LAB1	Sonograph images analysis and interpretation.
LEC7	AUVs, ROVs and underwater positioning.
LAB2	Underwater positioning data analysis and its impact on the survey quality.
LEC8	Interferometry and synthetic aperture techniques.
LEC9	Bathymetry data cleaning. DTM creation.
LAB3	Creating a bathymetric map based on the survey data.
LEC10	Hydrographic products and deliverables.
EX3	Working with survey documentation.
LEC11	Navigational aids - planning and establishing.
EX4	Test.

TEACHING AIDS

1	Notebook and multimedia projector, internet access.
2	Whiteboard and colour felt-tips.
3	Nautical charts, triangles and dividers.
4	Nautical publications.
5	Computer lab with dedicated hydrographic software.

METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)

F1	Written personal reports from laboratory tasks and exercises.
S1	Final test.

STUDENT WORKLOAD

Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	0	0	36	0	0	36
<i>Lectures</i>						20			20
<i>Exercises</i>						8			8
<i>Laboratories</i>						8			8
<i>Simulator</i>									0
Student work:	0	0	0	0	0	36	0	0	36

<i>Preparation for classes</i>						36			36
TOTAL NUMBER OF HOURS						0	0	0	72
Number of ECTS points									3
LITERATURE									
Basic									
1	C-13 Manual on Hydrography, IHO, 2011.								
2	S-44 Standards for Hydrographic Surveying.								
3	Jong de C. D.: Hydrography, 2006.								
4	Blondel P.: The Handbook of Sidescan Sonar, 2009.								
Recommended									
1									
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Karolina Zwolak, k.zwolak@amw.gdynia.pl								
2	Artur Grzadziel, a.grzadziel@amw.gdynia.pl								
3	Henryk Nitner, h.nitner@amw.gdynia.pl								
4	Artur Makar, a.makar@amw.gdynia.pl								

C.II.5 Sonar systems fundamentals and operation principles

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	SONAR fundamentals and operation principles (S)							
2. Code of subject:								
3. Department:	Department of Naval Weapons							
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Specialty subjects							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	V							
10. Profile:	Practical							
11. Lecturer:	PhD Eng. Adam Cichocki							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	To teach the principles of underwater sound.							
A2	To teach the rules of sound propagation in the sea							
A3	To teach the classification and features of passive and active sonar systems.							
A4	To explain the sonar equations use the Figure of Merit.							
A5	To teach the naval sonar systems for MCM, ASuW and ASW operation.							
A6	To teach how to use naval passive and active sonars in simulated ASuW and ASW operation.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	Students have basic knowledge and ability to use computer.							
2	Students have basic knowledge on physics law and mathematics.							
LEARNING OUTCOMES								
LO1	Demonstrate a knowledge of the physical properties associated with the underwater sound.							
LO2	Demonstrate general knowledge about sonar equations and FoM.							
LO3	Discuss the basic principles, classification and features of passive and active sonar systems.							
LO4	Demonstrate knowledge of the designations and functions of sonar for MCM and ASW operation.							
LO5	Demonstrate ability to use sonar systems in simple MCM and ASW operation.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1-6	9	EX1	4				
LO2	LEC7	2						
LO3	LEC8	1						
LO4	LEC9-10	3						
LO5	LEC11	3			LAB1	14		

Total hours		18		4		14		0	
SUBJECT MATTER CONTENT									
LEC1	Introduction (1).								
LEC2	Fundamentals of sound in the sea (2).								
LEC3	Speed of sound in the sea (1).								
LEC4	Sound speed profiles (1).								
LEC5	Propagation paths (2).								
LEC6	Sound sources and noise (2).								
LEC7	Sonar equation terms, passive and active sonar equation (2).								
EX1	Sound speed in the sea (4).								
LEC8	Architecture of passive and active sonar systems (1).								
LEC9	Sonar signal analysis and displaying (1).								
LEC10	Passive and active sonar systems in ASW/ASuW operations (2).								
LEC11	Sonar operation principles (3).								
LAB1	Sonar operation exercises in simulated environment (14).								
TEACHING AIDS									
1	Lectures with multimedia presentation.								
2	Literature and recommended resources.								
3	Sonar simulators of Advanced Underwater Warfare Simulator and SCTT.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
S1	Written test.								
S2	Positive result of practical test on sonar simulators.								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	0	0	36	0	0	36
<i>Lectures</i>						18			18
<i>Exercises</i>						4			4
<i>Laboratories</i>						14			14
<i>Simulator</i>									0
Student work:	0	0	0	0	0	36	0	0	36
<i>Preparation for classes</i>						36			36
TOTAL NUMBER OF HOURS	0	0	0	0	0	72	0	0	72
Number of ECTS points						3			3
LITERATURE									
Basic									
1	Hall J.: Principles of Naval Weapons Systems (electronic distribution).								
2	Sonar Acoustics Handbook, NURC 2008.								
3	Hansen R.E.: Introduction to Sonar, Oslo 2010.								
4	Discover the sound in the sea: http://www.dosits.org/								
Recommended									
1	Sonar operation manual of SCTT and Advanced Underwater Warfare Simulator (AUWS).								
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Adam Cichocki, a.cichocki@amw.gdynia.pl								

3.3. THESIS

D.1 Methodology of thesis preparation

I. DETAILED SUBJECT DESCRIPTION								
1. Title of subject (O/S)*:	Methodology of thesis preparation (O)							
2. Code of subject:								
3. Department:	Institute of Navigation and Marine Hydrography							
4. Major:	Navigation							
5. Specialty:	Maritime navigation							
6. Module:	Thesis							
7. Level of education:	First-degree studies							
8. Form of education:	Full-time studies							
9. Semester:	VI							
10. Profile:	Practical							
11. Lecturer:	Prof. Andrzej Felski							
12. Date of update:	10 March, 2018							
* O/S – obligatory / selective								
AIM OF SUBJECT								
A1	Introduction with the meaning of the thesis in the process of the academic education.							
A2	Explanation of each notions bearing upon of the creative work.							
A3	Delivery of fundamentals of the organization of the process of investigation and constructions of the reports from research.							
A4	Understanding of the meaning of the aim of research, hypotheses, investigative methods and structures of the reports from research.							
A5	Delivery of practical advices within the range the organization of the investigative trial.							
A6	Teaching of rules of the analysis and the interpretation of findings.							
A7	The preparation to the final examination and the defence of the thesis.							
PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCES								
1	The credit of all elements of the major.							
LEARNING OUTCOMES								
LO1	Understands the part of the thesis pendant of studies.							
LO2	Understands the sense of research and the creative work.							
LO3	Understands the part of sources of the knowledge and can it find and interpret.							
LO4	There can organize the investigative process.							
LO5	Student can to prepare the presentation of findings.							
STRUCTURE OF SUBJECT								
	Form of classes - lecture	Number of hours	Form of classes - exercise	Number of hours	Form of classes - laboratory	Number of hours	Form of classes - simulator	Number of hours
LO1	LEC1	2						
LO2	LEC2	2	EX1-3	8				
LO3			EX4	4				
LO4			EX5, EX7	10				
LO5			EX6	4				

Total hours		4		26		0			0
SUBJECT MATTER CONTENT									
LEC1	Introduction. The meaning of the thesis on studies.								
LEC2	Creative work; Knowledge and science; Explorations and inventions.								
EX1	Definition of the thesis, kinds of theses, the methodology of its realization. The finding of sources.								
EX2	Theme and the aim of the thesis. Methods of research.								
EX3	The construction of the thesis, practical advices.								
EX4	The preparation and the realization of research, the analysis of results.								
EX5	Rules of the edition of the report.								
EX6	The form and the range of the final examination; the preparation of the presentation.								
EX7	The preparation of the idea of the thesis and schedule of its realization.								
TEACHING AIDS									
1	Notebook and multimedia projector.								
2	Folios projector.								
3	Whiteboard and colour felt-tips.								
METHOD OF ASSESSMENT (F - FORMATIVE, S - SUMMATIVE)									
F1	Written personal reports from EX7.								
F2	Active participation in seminars.								
STUDENT WORKLOAD									
Form of activity	Number of hours per semester								Total
	0	I	II	III	IV	V	VI	VII	
Contact hours:	0	0	0	0	0	0	30	0	30
<i>Lectures</i>							4		4
<i>Exercises</i>							26		26
<i>Laboratories</i>									0
<i>Simulator</i>									0
Student work:	0	0	0	0	0	0	30	0	30
<i>Preparation for classes</i>							30		30
TOTAL NUMBER OF HOURS	0	0	0	0	0	0	60	0	60
Number of ECTS points							2,5		2,5
LITERATURE									
Basic									
1	Notes of professor / pdf presentations.								
2	Snieder R., Lerner K.: A guide for graduate students and their mentors. Cambridge University Press 2009.								
3	Gustavii B.: How to write and illustrate a scientific paper. Cambridge University Press 2003.								
Recommended									
LECTURER (NAME AND SURNAME, E-MAIL)									
1	Andrzej Felski, a.felski@amw.gdynia.pl								

D.2 Thesis

Number of hours

Semester	Number of hours								Obligatory / selected	Requirements	ECTS points
				contact hours according to type							
	contact	preparation	total	lectures	exercises	laboratories	simulators	total			
0	0	0	0					0			
I	0	0	0					0			
II	0	0	0					0			
III	0	0	0					0			
IV	0	0	0					0			
V	0	0	0					0			
VI	0	0	0					0	O	E	4
VII	0	0	0					0			
Ogółem	0	0	0	0	0	0	0	0			4

Note

The ECTS points are earned after submit the thesis.