

Subject card

Subject name and code	Steam and Gas Turbines (WOiO), PG_00042091							
Field of study	Power Engineering, Power Engineering							
Date of commencement of studies	October 2021		Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies		Subject group					
Mode of study	Full-time studies		Mode of delivery			at the university		
Year of study	3		Language of instruction			English		
Semester of study	6		ECTS credits		4.0			
Learning profile	general academic pro	ofile	Assessment form		assessment			
Conducting unit	Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology							
Name and surname	Subject supervisor		dr hab. inż. Jerzy Głuch					
of lecturer (lecturers)	Teachers							
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
of instruction	Number of study hours	15.0	0.0	0.0	0.0		15.0	30
	E-learning hours included: 0.0							
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study		SUM
	Number of study hours	30		5.0		65.0		100
Subject objectives	gaining knowledge on thermal turbines							

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Rick_UOT is able to use basic strokedge of full for form machines and methods related to their commenced approach to the preliminary design of an energy installation	Learning outcomes	Course outcome	Subject outcome	Method of verification				
involvedige on the operation of energy equipment in the field of thermal power plants, thermal and combustion engines, compressors and rotating machines to assess the technical condition of the system IRG, W13 has basic knowledge of the operation of energy equipment plants, thermal and heating systems, internal combustion engines, compressors and rotating machines to assess the technical condition of the system combustion engines, compressors and rotating machines, the basic combustion of energy equipment and methods of their selection depending on the needs IRG W12 has basic knowledge of the life operation of their selection depending on the needs IRG W12 has basic knowledge of the life operation of the selection depending on the needs IRG W12 has basic knowledge of the life operation of heat and energy equipment in the field of thermal energy equipment in the field of thermal energy equipment in the field of thermal energy services and installations, base principles of energy systems and heating systems, internal combustion engines and compressors as well as rotating machines IRG, W08 (now classic and technologies, rules for the selection and operation of heat and energy devices and installations, base principles of energy systems operation, basic energy devices and installations, base principles of energy several dependency of energy systems operation basic energy services and disposales, environmental effects of energy technologies used, methods of energy several energy se		knowledge of fluid flow machines and methods related to their design in an analytical and numerical approach to the preliminary design of an energy						
The operation of energy equipment in the field of thermal power plants, thermal and energy and heating systems, internal energy energy equipment and methods of their selection depending on the regulation of energy equipment and methods of their selection depending on the heads of the first selection depending on the heads of the first selection depending on the heads of the systems, internal and systems, internal and systems, internal combustion engines and compressors as well as rotating matchines [K6, W12] has basic knowledge of the life cycle and repairs of energy experiment combustion engines and compressors as well as rotating matchines [K6, W16] knows classic and developmental energy technologies, rules for the selection and operation of heat and energy devices and constitution of the selection and operation of heat and energy devices and operation of heat and energy devices and diagnostics, environmental effects of energy technologies used, methods of using renewable energy sources Salic components of a thermal broken prover units and prover units requipped with steam turbine (rain types of nuclear reactors, main thermal cycles, parameters of nuclear power units.) Theory of turbine axial stage, blading systems flows, losses components of turbine stage, effects of multistage turbine, or commental and internal effection.) Principles of choice of basic parameters of stages and groups of stages. Multistage turbines, efficiency and power of multistage turbine, and content and an internal effection.) Principles of choice of basic parameters of stages and groups of stages. Multistage turbines, efficiency and power of multistage turbine, and content and content provers. In the province of the final grade leading system coling. Losses caused by turbine stage cooling. Combustion chambers types. Prerequisites Assessment methods and contents. Basic Illerature Person of the final grade leading sy		knowledge on the operation of energy equipment in the field of thermal power plants, thermal and energy and heating systems, combustion engines, compressors and rotating machines to assess the technical condition of the						
if he life cycle and repairs of energy equipment in the field of thermal power stations, thermal and energy systems, internal combustion engines and compressors as well as rotating machines IKG_WORD knows classic and developmental energy technologies, rules for the selection and operation of heat and energy devices and installations, basic principles of energy systems operation, basic issues regarding the reliability of energy devices and diagnostics, environmental effects of energy technologies used, methods of using renewable energy sources Subject contents		the operation of energy equipment in the field of thermal power plants, thermal and energy and heating systems, internal combustion engines, compressors and rotating machines, has basic knowledge of the regulation of energy equipment and methods of their selection depending on the						
developmental energy technologies, rules for the selection and operation of heat and energy devices and installations, basic principles of energy systems operation, basic issues regarding the reliability of energy devices and diagnostics, environmental effects of energy technologies used, methods of using renewable energy sources Basic components of a thermal turbine cycle, Choice of a structure and main cycle parameters. Turbines of power stations and domestic heating power stations. Nuclear power unlist equipped with steam turbine (main types of nuclear reactors, main thermal cycles, parameters of nuclear power unlist equipped with steam turbine (main types of nuclear reactors, main thermal cycles, parameters of nuclear power unlist equipped with steam turbine (main types of nuclear reactors, main thermal cycles, parameters of nuclear power unlist equipped with steam turbine (main types of nuclear reactors, main thermal cycles, parameters of nuclear power unlist equipped with steam turbine (main types of nuclear reactors, main thermal cycles, parameters of nuclear power unlist equipped with steam turbine (main types of functions of nuclear power unlist equipped with steam turbine (main types of functions of nuclear power unlist equipped with steam turbine, continued to the parameters of stages and groups of stages. Multistage turbines, efficiency principles of choice of basic parameters of stages and groups of stages. Multistage turbines, efficiency principles of choice of basic parameters of stages and groups of stages. Multistage turbines, efficiency and power of multistage turbine, characteristic turbine stages, control stage problems, last stage cooling. Combustion chambers types. Percequisites		the life cycle and repairs of energy equipment in the field of thermal power stations, thermal and energy systems and heating systems, internal combustion engines and compressors as well						
power stations and domestic heating power stations. Nuclear power units equipped with steam turbine (main types of nuclear reactors, main thermal cycles, parameters of nuclear power units). Theory of turbine axial stage, blading systems flows, losses components of turbine stage, effects of multistage flows, circumferential and internal efficiency. Principles of choice of basic parameters of stages and groups of stages. Multistage turbines, efficiency and power of multistage turbine, characteristic turbine stages, control stage problems, last stage problems of condensing type turbine. Performance of stages in wet steam regions, efficiency losses, erosion and corrosion problems. Gas turbine blading system cooling. Losses caused by turbine stage cooling. Combustion chambers types. Prerequisites and co-requisites Assessment methods and criteria Subject passing criteria Passing threshold Percentage of the final grade lecture 60.0% 50.0% Recommended reading Basic literature Perycz S., Turbiny parowe i gazowe, Politechnika Gdańska, Skrypt,Gdańsk 1988Perycz S., Turbiny parowe i gazowe, Maszyny Przepływower T. 10, Wydawnictwo Instytut Maszyn Przepływowych PAN, Gdańsk 1992. Kosowski K, Ship Turbine Power Plans, Wyd. PG Delft University, Gdańsk 2004Kosowski K, Introduction to the theory of marine turbines, Wyd. PGDelft University, Gdańsk 2004 Example issues/ example questions/ tasks being completed Poscribe losses different from blade losses in turbine stage Percentagion with the stage turbine, effects of multistage flows, circumferential and internal efficiency. Principles of stages, multistage turbine, circumferential and internal efficiency. Principles of choice of basic sturbine stage, effects of multistage flows, circumferential and internal efficiency. Principles of condensing turbine,		developmental energy technologies, rules for the selection and operation of heat and energy devices and installations, basic principles of energy systems operation, basic issues regarding the reliability of energy devices and diagnostics, environmental effects of energy technologies used, methods of						
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and criteria lecture		basic knowledge in thermodynamics	and fluid dynamics					
Recommended reading Basic literature Perycz S., Turbiny parowe i gazowe, Politechnika Gdańska, Skrypt,Gdańsk 1988Perycz S., Turbiny parowe i gazowe, Maszyny Przepływowe T. 10,Wydawnictwo Instytutu Maszyn Przepływowych PAN, Gdańsk 1992.Kosowski K, Ship Turbine Power Plans, Wyd. PG Delft University,Gdańsk 2004Kosowski K, Introduction to the theory of marine turbines, Wyd. PGDelft University, Gdańsk 2004 Supplementary literature World's technical press eResources addresses Adresy na platformie eNauczanie: Describe losses different from blade losses in turbine stage example questions/ tasks being completed		Subject passing criteria	Passing threshold	Percentage of the final grade				
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Skrypt,Gdańsk 1988Perycz Ś., Turbiny parowe i gazowe, Maszyny Przepływowe T. 10,Wydawnictwo Instytutu Maszyn Przepływowych PAN, Gdańsk 1992.Kosowski K, Ship Turbine Power Plans, Wyd. PG Delft University,Gdańsk 2004Kosowski K, Introduction to the theory of marine turbines, Wyd. PGDelft University, Gdańsk 2004 Supplementary literature World's technical press eResources addresses Adresy na platformie eNauczanie: Example issues/ example questions/ tasks being completed Describe losses different from blade losses in turbine stage		seminary	100.0%	50.0%				
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example questions/ tasks being completed		eResources addresses Adresy na platformie eNauczanie:						
Work placement Not applicable	example questions/	Describe losses different from blade losses in turbine stage						
	Work placement	Not applicable						

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