GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fundamentals of machine engineering, PG_00044532		
Field of study	Transport		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Szymon Grymek	
	Teachers	dr hab. inż. Szymon Grymek mgr inż. Marek Łubniewski	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	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	15.0	50

Subject objectives	Acquainting the student with kinds and appropriation of the machines. Acquainting with rules of operation and functions of basic components or sub-assemblies of machines, as: detachable and inseparable connections, axles and shafts, bearings, clutches, brakes and transmission gears. Acquainting with basic technologies for production of machines. Taking control by the student of solving the basic tasks concerning the strenght of machine elements.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W03] has basic knowledge of hydromechanics, thermodynamics, machine design, materials science and electrical engineering required for understanding the principles of construction and operation of means of transport	Student describes basic machine components as: permanent joints and temporary fasteners, axis and shafts, bearings, clutches, brakes and gears. Interprets principle of they operation and shows they functions. Solves basic problems of machine components strength.	[SW1] Assessment of factual knowledge
[K6_K02] understands the need to formulate and communicate to the public information and opinions on the achievements of environmental engineering and other aspects of work of a sanitary industry engineer; is aware of the importance of and understands non-technical aspects and consequences of engineering; takes steps to communicate such information and opinions in a comprehensible manner and present different points of view	Student is aware of the validity of non-technical conditions and the effects of engineering activities . Student is aware of the responsibility for decisions.	[SK5] Assessment of ability to solve problems that arise in practice
[K6_U09] able to, when formulating and solving engineering problems in transport, use the right methods and devices to carry out measurements of basic values and parameters used in transport, carry out stress tests of structures, select the right materials, select elements of devices	Student is able to analyze the strength of structural systems . Student is able to select construction materials and elements of mechanical systems.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools

Subject contents

Definition of the machine. Classification of the machines according to they destination, principle of operation and form of the energy. Branch classification of the machines. Basic information about machine design. Rules of the design, design process, designer tasks in the designing process. Fatigue strength of the machine components, influence of notch effect. Types of joints of machines components. Rules of the design and strength calculations of temporary fasteners and permanent joints of machines components: welded, bolted and shaped. Strength calculations of axis and shafts, rules of them shape definition. Types of shaft - hub connections and their properties. Significance and role of bearings. Ball and sliding bearings systems for axis and shafts. Choice of bearings for machine bearing systems. Durability of ball bearings. Clutches and breaks in mechanical systems, significance and functions. Types of clutches. Characteristics and properties of mechanical gears: belt, friction and toothed. Basic techniques of machines components production.

Prerequisites and co-requisites

Basic knowledge of the subjects: Mathematics, Physics, Technical Mechanics and Engineering Graphics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Colloquium - exercise part	50.0%	40.0%
Colloquium - lecture part	50.0%	60.0%

Recommended reading

Basic literature

1. Appel M.: Maszynoznawstwo, WNT, Warszawa,1976. 2. Osiński Z., Bajon W., Szucki T.: Podstawy Konstrukcji Maszyn, WNT, Warszawa, 1986. 3. Siwek J.: Wykład z PKM, Połączenia spawane, zgrzewane i klejone, Skrypt PG, Gdańsk, 1997. 4. Kochanowski M.: Wykład z PKM, Wały i Osie, Skrypt PG, Gdańsk, 1998. 5. Maciakowski R.: Wykład z PKM, Połączenia Śrubowe, Skrypt PG, Gdańsk, 1998.

Supplementary literature

1. Dietrych M. (red.): Podstawy Konstrukcji Maszyn tom II, WNT, Warszawa, 1999. 2. Dietrych M. (red.): Podstawy Konstrukcji Maszyn tom III, WNT, Warszawa, 1999.

	eResources addresses	Adresy na platformie eNauczanie: Podstawy budowy maszyn, W/C, Transport WILiŚ, sem. 02, letni 22/23 (PG_00044532) - Moodle ID: 28529 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28529
Example issues/ example questions/ tasks being completed	Strength of bars and beams.Strength of welded joints.Calculation of bolted connections.List the stages of the design process.List the construction rules.Provide ways to avoid fatigue load.Rational selection of cross-sections of elements due to the distribution of bending or torsional stress.Friction in machines and its effects.List the basic types of rolling bearings.Tasks of couplings in drive systems.Replace the friction pin-hub connections.List the types of welded joints.Give examples of using threads in machine construction.How can the screw connection be secured against loosening due to vibration?Tasks of transmission in propulsion systems.List the methods of plastic forming.List typical machining methods.	
Work placement	Not applicable	