GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fundamentals of machinery construction I, PG_00061989		
Field of study	Management and Production Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Zakład Konstrukcji Maszyn i Inzynierii Medycznej -> 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. Tomasz Żochowski	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	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	60	6.0	59.0	125

Subject objectives	Familiarization with phenomena in technical systems, especially in machine elements or sub-assembles. Familiarization with calculation models for construction of machines, especially with calculation models for stress in material of elements under continuous or fatigue loading. Familiarization with elements and assembles commonly used in machines - with structure and operation principles of bearings, clutches, brakes, connections journal-hub, shafts, axies, welded connections, screw connections, spring elements and mechanical gearings.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_K01] feels the need for self-realization by learning throughout life, is looking for modern and innovative solutions in their actions, is able to think creatively and act in an entrepreneurial way	Student analyses phenomena in technical systems, especially in machine elements or sub-assembles. Student explains basics of project methodology.	[SK5] Assessment of ability to solve problems that arise in practice
	[K6_W03] has knowledge of the design record (the record structure)for the preparation of the manufacturing process documentation and basic knowledge of the implementation and management of production systems, including the principles of designing machine parts and manufacturing technologies using information techniques	Student has the necessary knowledge in the field of engineering drawing and the design and selection of typical machine elements.	[SW1] Assessment of factual knowledge
	[K6_W09] knows the general principles of creating and developing forms of individual entrepreneurship and stimulating employee creativity, using knowledge in the field of design, production and operation of machinery and technical devices	Student knows the methods of stimulating creativity used in the design process.	[SW1] Assessment of factual knowledge
	[K6_U09] can use analytical techniques as well as computer simulation and numerical analysis methods in solving specific problems in the field of production engineering, is able to carry out simple engineering tasks related to the production of typical machine parts using widely understood techniques and computer tools, is able to select and apply appropriate methods of project planning and control courses with the use of computer aided means	Student uses analytical techniques to solve technical tasks in the field of production engineering.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
	[K6_W07] has knowledge of methods, errors and measurement uncertainty, product geometry specifications and assessment of their accuracy	Student has knowledge of the tolerances of dimensions, shape and position and their impact on the functioning of machine parts.	[SW1] Assessment of factual knowledge
	[K6_U04] is able to develop documentation in the area of preparation, implementation and control of production processes in Polish and in a foreign language considered basic for scientific fields, is able to identify and formulate the basic objectives of quality management in the product life cycle, is able to use information and communication techniques appropriate to the implementation of tasks typical in engineering activities including preparation, production and supervision of the manufacturing process	Student is able to carry out calculations and present their results in a form consistent with the requirements of the design process.	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task
Subject contents	Fundamentals of design methodology. System approach to technical systems. Modeling and optimization in design. Ultimate and fatigue strength. Security factor. Knowledge bases in engineering design. Computer aided design process. Friction in machines. Rolling, sliding and non-conventional bearings. Seals in mechanical engineering. Clutches and brakes. Shafts and axles. Shaft-hub connections. Spring elements. Drive systems. Welded, soldered and glued connections. Threaded and riveted connections. Mechanical gears: toothed, belt, chain and friction.		
Prerequisites and co-requisites	Basic knowledge of technnical drawing, materials science, mechanics, strength of materials and manufacturing technology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Colloquium - exercises	50.0%	40.0%
	Exam	50.0%	60.0%

Recommended reading	Basic literature	Kochanowski M.: Podstawy konstrukcji maszyn. Wybrane zagadnienia. Gdańsk: P. Gdańska 2002. Przykłady obliczeń z podstaw konstrukcji maszyn (pod. red. Mazanek E.). Warszawa: Wyd N-T 2008. Tarnowski W.: Podstawy projektowania technicznego. WNT 1997. Osiński Z., Bajon W., Szucki T.: Podstawy konstrukcji maszyn. Wyd. PWN. Wykład z Podstaw Konstrukcji Maszyn z ćwiczeniami rachunkowymi. Praca zbiorowa. (Zbiór skryptów opracowanych w Katedrze Konstrukcji i Eksploatacji Maszyn PG) Wyd. Politechniki Gdańskiej. Podstawy Konstrukcji Maszyn. Cykl monografii wydawanych przez PWN. Kurmaz L. W., Kurmaz O. L.: Projektowanie węzłów i części maszyn. Kielce: Wydawnictwo Politechniki Świętokrzyskiej.
	Supplementary literature	Beitz G. P. W.: Nauka konstruowania. W-wa: Wyd. N-T 1984
	eResources addresses	Adresy na platformie eNauczanie: Podstawy konstrukcji maszyn I, WC, ZiIP I, sem. 04, letni 23/24 (PG_00055060) - Moodle ID: 36259 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36259
Example issues/ example questions/ tasks being completed	Assortment of roller bearings.Start-up of the driving system with the friction coupling.Calculation of the connections journal-hub.Constructing of the shaft or the axle.Engineering calculations for immediate and fatigue strength. Calculation of the safety coefficient.Modelling and optimization of connections in machine design.Calculation of the welded connections.Calculation of the screw connections (bolts, nuts, etc.).Calculation of the spring.	
Work placement	Not applicable	

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