GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Machines Design 1, PG_00049768		
Field of study	Power Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
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	3	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Machine Design and Vehicles -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Łubiński	
	Teachers		

Lesson types

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	4.0	16.0	50

Subject objectives

Repetition and strengthening of skills in technical mechanics, materials science and other, earlier engineering courses taken. Instruction on knowledge and skills required for the solution of practical tasks in mechanical engineering, with the use of science.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U01] can obtain information from literature and other sources, organize, interpret it and draw and formulate conclusions; has the ability to self-educate, interprets the results of completed engineering tasks, is able to design simple energy systems and their systems	Development of skills in search, evaluation and classification of information required for the solution of tasks in mechanical engineering.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K6_W04] has structured knowledge of mechanics, including the issues of material strength and general principles of shaping structures, necessary to conduct basic strength analyzes and design simple mechanical or construction systems for power industry or environmental engineering; knows the basics of machine construction and the most commonly used construction and operating materials	Capacity to use knowledge and skills in the sciences for tackling of technological tasks.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects

Subject contents

Course content – lecture
Evaluation of reactions, profiles of moments of forces in members. Use of the equations of static equilibrium for engieering tasks. Evaluation of static and dynamic reactions. Component stress and equivalent stress. Types of engineering stress. Evaluation of geometric parameters of members. Fundamentals of threaded bolt connections and welded connections - calculation models. Safety factor. Allowable stress. Friction in mechanical engineering.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Competency in techncal mechanics and strength of materials: addition and subtraction of forces, evaluation of reactions in static systems, evaluation of load and support conditions in mechanical systems, physical properties of materials commonly used in machine design, basic knowledge on steels. Mathematics: calculus, symbolic equation manipulation, creation and solution of sets of linear equations, trigonometry, vector calculus, integral and differential calculus.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Test x2</td><td>45.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Fundamentals of Machine Design,
Engineering Graphics,
Engineering Materials,
Mechanical Engineer's handbook
Machine Design by Robert L. Norton</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Fizyka, Haliday & Resnick,
The Fabric of Reality, D.Deutsch</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">Evaluation of component stresses.
Evaluation of equivalent stress.
Evaluation of stress in members subjected to complex load cases (e.g. tension+torsion+bending).
Evaluation of reaction forces in static cases.
Evaluation of bending and torsional moment profiles, and of transverse and axial forces.
Engineering calculation methods in premanent and removable connections used in mechanical engineering.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="3">Not applicable</td></tr>
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