GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modelling in machine design, PG_00064817		
Field of study	Mechanical Engineering		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2026/2027
Education level	second-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	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Institute of Mechanics and Machine Design -> 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	30.0	0.0	0.0	30.0	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	7.0	33.0	100

Subject objectives

Improvement and integration of the knowledge and skills gained on earlier stages of engineering training. Opportunity to gain a wide scope of understanding of the use of methods used for the development of engineering models of phenomena and processes in reali - life cases of engineering tasks. Obtainment of connections between the skills in use of modern tolls for engineering analysis and the reality of practical activity on the basis of numerous examples of tasks realised in co - operation with indistrial organisations.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U02] formulates and solves technical problems specific to Mechanics and Mechanical Engineering using appropriate tools including CAD and MES systems, and prepares technical documentation	the ability to formulate and solve technical problems specific to Mechanics and Machine Design, using appropriate tools, including CAD and MES systems, as well as to develop technical documentation of machines	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K7_U15] evaluates the feasibility of advanced methods and tools for solving complex engineering tasks of a practical nature, characteristic of the field of study, and selects and applies appropriate methods and tools for this purpose	skillfully assesses the usefulness of advanced methods and tools for solving a complex engineering task of a practical nature, characteristic of the field of study, and selects and applies appropriate methods and tools for this purpose	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
[K7_W11] interprets social, economic, legal (including industrial and intellectual property laws), and other non-technical aspects of engineering activities, and includes them into engineering practice	the ability to interpret social, economic, legal (including those related to the protection of industrial property and copyright) and other non-technical conditions of engineering activities and to take them into account in engineering practice	[SW1] Assessment of factual knowledge
[K7_W02] demonstrates a structured and theoretically grounded knowledge of the key topics in Mechanical Engineering enabling the analysis and modelling of mechanical systems, processes and devices	practical competence in structured and theoretically based knowledge covering key issues in the field of Mechanics and Machine Design allowing for the analysis and modeling of systems, processes and mechanical devices	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Course content – lecture

Mechanical devices' and machine failure analysis in real-life industrial environment.
Evaluation of the models of machine components' support and load in real - life conditions of use on the basis of scattered sources of information.
Fatigue of materials - ammendment and broadening of the basic scope.
Numerical analysis of selected technical tasks with the use of the ANSYS environment.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Completed courses in fundamentals of machine design,engineering mechanics, materials science, manufacturing technologies (machining, welding, plastic forming), engineering graphics or engineering drawing. Undestanding of the physical foudations of the funcioning of machines and basics of machine construction.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>practical training completion</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>Fundamentals of Machine Design
Engineering Graphics for Mechanical Engineers
Metal cutting handbook
Plastic forming of metals handbook
Welding engineers handbook
Mechanical Engineer's handbook
Machine Design by Robert L. Norton</td></tr><tr><td>Supplementary literature</td><td>Physics, Resnick & Haliday
The Fabric of Reality, D.Deutsch
The Emperor's New Mind, Roger Penrose</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Analytical evaluation of the causes of a machine failure in an industrial facility. Investigation into the load and support model and detailed reconstruction of the functional determinants pertaining to the machine.
Numerical analysis of exemplary tasks in machine elements' engineering.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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