GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00058716
Field of study	Materials Engineering, Materials Engineering

Date of commencement of studies	February 2024	Academic year of realisation of subject	2023/2024
Education level	second-cycle studies	Subject group	Optional subject group 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	assessment

Conducting unit	Division of Manufacturing and Production Engineering -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Piotr Sender
	Teachers	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	30.0	0.0	45
	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	45	5.0	50.0	100

Subject objectives	Familiarizing students with the possibilities of using CAD / CAM systems for the design of machining processes and computer-aided programming of CNC machines

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U05	The student is able to describe typical procedures and procedures for planning machining in systems CAD/CAM. The student knows the typical strategies used in CAM systems for a given method of machining. The student indicates the rules for the selection of machining strategies in CAM systems depending on the requirements the technical accuracy and quality of the machined surface and the geometry of the workpiece.	[SU1] Assessment of task fulfilment
	K7_K01	The student is open to the implementation of information technology in engineering activities. Can independently develop the knowledge gained in the subject. He can work in a project team using computer systems supporting engineering works.	[SK5] Assessment of ability to solve problems that arise in practice
	K7_U01	The student is able to determine the machining parameters on the basis of industry catalogs, depending on the machining method used, the type of tool and the workpiece material.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information
	K7_W05	The student is able to make 3D models of the workpiece and stock. Configures the CAM module to planning the machining of a workpiece with a specific geometry. Selects appropriate machining strategies depending on on the geometry of the workpiece and technological requirements for a given method of machining.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	Lecture:
	1. Characteristics of CAD/CAM systems. Methodology of technological process planning in CAD/CAM systems. Presentation of NX and EdgeCAM systems.
	2. Construction of a CNC machine. Coordinate system. Postprocessor. Machine configuration. Fixtures.
	3. Creating sample control code by creating a program manually.
	4. Methodology of designing turning machining in CAD/CAM systems using edge files.
	5. Design methodology for turning machining in CAD/CAM systems using solid files.
	6. Methodology of designing milling in CAD/CAM systems using edge files.
	7. Methodology of designing milling in CAD/CAM systems using solid files.
	8. Multi-axis machining of complex spatial surfaces.
	9. Simulation and verification of the machining process in CAD/CAM systems. Collision analysis. Visualization of the manufacturing process.
	10. Tool list, machining time, part cost.
	Lab:
	1. Definition of geometric data of the workpiece and stock, determination of the method of attachment and machining parameters. Determination of the coordinate system.
	2. Creating a control program using workshop documentation.
	3. Designing turning machining in CAD/CAM systems using edge files.
	4. Designing turning machining in CAD/CAM systems using solid files.
	5. Designing milling in CAD/CAM systems using edge files.
	6. Designing turning machining in CAD/CAM systems using solid files.

Prerequisites and co-requisites	Basic knowledge in the field of information technology and knowledge in the field of manufacturing techniques and designing technological processes. Basic skills in solid modeling of parts in the CAD 3D system. Ability to work in a project team, awareness of responsibility for the tasks performed.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	machining design	60.0%	100.0%

Recommended reading	Basic literature	1. M. Mielnica, W. Wiśniewski, Computer aided design of technological processes, PWN, Warsaw 2005
		2. K. Augustyn, EdgeCAM, Computer Aided Manufacturing, Helion 2006

| | Supplementary literature | 1. EdgeCam tutorials.

2. NX tutorials. |
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| | eResources addresses | Adresy na platformie eNauczanie:

Projektowanie CAD/CAM (PG_00058716) - Moodle ID: 37245
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37245 |
| Example issues/ example questions/ tasks being completed | Discuss the use of CAD/CAM systems as an example.

Rotary mode vs flat mode.

Discuss the issue of the configuration of CNC machine tools and multi-axis machining.

Discuss the issue of the machine tool control code.

Describe possible problems resulting from using an untested postprocessor. | |
| Work placement | Not applicable | |

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