GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer Aided Manufacturing (CAM), PG_00055396		
Field of study	Mechanical Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Zakład Technologii Maszyn i Automatyzacji Produkcji -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Mariusz Deja	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	15.0	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	4.0	36.0	100

Subject objectives

Learning the basic techniques of computer-aided manufacturing, especially programming CNC machines with the use of CAM software

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U08] is able to design a technological manufacturing process for typical elements of machines or devices, using analytical and numerical calculating tools	The manufacturing process selection depending on the class, type of parts, material, and dimensional and shape requirements.	[SU4] Assessment of ability to use methods and tools
[K6_W11] possesses knowledge on design, technology and manufacturing of machine parts, metrology, and quality control; knows and understands methods of measuring and calculating basic values describing the operation of mechanical systems, knows basic calculating methods applied to analyse the results of experiments	The student can design technological processes of typical machine parts for the available means of production, including measuring devices and analysis of experimental results.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U04] is able to perform a critical analysis of the existing technical solutions, present the specification of the technology of manufacturing basic construction elements of machines and engineering assemblies	The student applies the practical use of CAD/CAM systems to present the designed technology for the production of mechanical components	[SU5] Assessment of ability to present the results of task
[K6_U02] is able to work in a team and individually, also in multi-disciplinary teams, is able to draw a plan of completing a construction or technological design, shows self-learning abilities	Group design of the technological process with the use of a computer system	[SU1] Assessment of task fulfilment

Subject contents	Systems for computer-aided manufacturing. Integration of CAD and CAM systems. The exchange of data between systems. Declaration of the workpiece, semi-finished product, tools and fixtures. Definition of machining cycle. Types of turning and milling machining cycles. Selection of machining strategy for specific areas treated. Declaration of cutting parameters. Treatment of free surfaces. High speed machining HSM. Databases in CAM systems. Files containing data access tools. Postprocessors machine tool. Simulation with an analysis of collision. Modification of machining programs. Trends in the development of computer aided manufacturing.
Prerequisites and co-requisites	Technical drawing, basics of manufacturing techniques, Computer Aided Design CAD

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	60.0%	40.0%
Projects	60.0%	20.0%
Active participation in lectures	80.0%	20.0%
Practical exercises during laboratories	60.0%	20.0%

Recommended reading

Basic literature	1. Przemysław Kochan. EdgeCAM. Wieloosiowe frezowanie CNC. Wydawnictwo Helion. Gliwice 2014. 2. Grzesik W., Niesłony P., Bartoszuk M.: Programowanie obrabiarek NC/CNC. WNT, Warszawa 2020, Wyd. IV. 3. Przybylski W., Deja M.: Komputerowo wspomagane wytwarzanie maszyn. Podstawy i zastosowanie. WNT, Warszawa 2007. 4. Augustyn K.: EdgeCAM. Komputerowe wspomaganie wytwarzania. Wydanie II. Helion, Gliwice 2006.
Supplementary literature	1. Grzesik, W. Advanced machining processes of metallic materials: theory, modelling and applications. Elsevier, 2016. 2. Kosmol J.: Automatyzacja obrabiarek i obróbki skrawaniem. WNT,Warszawa 2000. 3, Chlebus E.: Techniki komputerowe CAx w inżynierii produkcji. WNT, Warszawa 2000.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. The range of applications of CAD/CAM manufacturing support systems.2. Use and integration of CAx techniques.3. Generating NC programs using the CAD/CAM system.4. Data exchange - between different systems.5. Design and technological compliance in computer-aided manufacturing.6. Object modeling - Feature Modeling.7. Generating variants of technological solutions.8. Trends in the development of CAx techniques in the field of computer-aided manufacturing.9. Integration of CAD / CAM systems with CAE systems.10. The structure of the standard of working time in terms of computer-aided production.11. Process planning for turning technology with the use of the CAD/CAM system.12. Process planning for milling technology with the use of the CAD/CAM system.13. List the steps to be followed when designing technology using the CAM system (EdgeCam) with the use of 2D models.14. List the steps to be followed when designing technology using the CAM system (EdgeCam) with the use of 3D models.15. Designations of the axes of the coordinate system for: turning, milling and designation of additional axes.16. List the types of models used in CAM systems.17. List the designs of CNC lathes (positioning of the tool head) and the consequences of tools, spindle revolutions, etc.18. Characterize the solid models.19. Characterize the surface models.20. Present the essential differences between the solid model and the surface model.21. Characteristics of parametric CAD design.22. Ways of determining the center of the coordinate system on the workpiece.23. Ways of determining the blank in CAM systems.24. Tasks of the technical preparation of production (TPP) department.
Work placement	Not applicable