GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer Aided Manufacturing Systems, PG_00054486		
Field of study	Mechatronics		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	English
Semester of study	1	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Manufacturing and Production Engineering -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Mariusz Deja	
	Teachers	dr hab. inż. Mariusz Deja	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	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	0.0	0.0	30

Subject objectives

Getting acquainted with the subject of computer-aided manufacturing as well as with the tendencies in modern manufacturing

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U81] is able to communicate with ease in foreign language at B2+ level of the Common European Framework of Reference for Languages (CEFR) in everyday life, in academic and professional environments	The ability to discuss a presented technical topic	[SU2] Assessment of ability to analyse information
[K7_K82] is equipped to participate actively in lectures, seminars and laboratory classes conducted in foreign language	Ability to communicate in a foreign language	[SK4] Assessment of communication skills, including language correctness
[K7_W81] has knowledge of complex grammatical structures and diverse lexical resources needed to communicate in foreign language in terms of general and specialist language related to field of study	Analysis of specialist literature in a foreign language	[SW1] Assessment of factual knowledge

Subject contents

Emergence of multitasking machining systems, applications and best selection practices. Manufacturing System classification. Flexible Manufacturing. Group Technology. Cell formation.Extra clustering algorithms. FMS control introduction. Petri nets fundamentals. CIM Concepts - information integration. Machine tool metrology. Robots in Manufacturing. Trends in the development of computer-aided manufacturing: STEP NC, cyber-physical manufacturing , digital twin in manufacturing. Intelligent manufacturing methods: smart manufacturing, Industry 4.0-based manufacturing systems, feature-based process planning. IoT - Internet of Things. Industrial Internet of Things - Cybermanufacturing Systems. Application Reverse Engineering Technology in Part Design and Manufacturing.

Prerequisites and co-requisites	Technical drawing, manufacturing techniques, basics of cutting technologies, Computer Aided Design CAD
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Colloquium	50.0%	50.0%
Presence during lectures	50.0%	50.0%

Recommended reading

Basic literature

1. Karkalos, N. E., Markopoulos, A. P., & Davim, J. P. (2019). *Computational Methods for Application in Industry 4.0*. Springer International Publishing.
2. McMahon, C., & Browne, J. (1999). *CADCAM: principles, practice and manufacturing management*. Addison-Wesley Longman Publishing Co., Inc..
3. Rao, R. V. (2010). *Advanced modeling and optimization of manufacturing processes: international research and development*. Springer Science & Business Media.
4. Scallan, P. (2003). *Process planning: the design/manufacture interface*. Elsevier.
5. Choi, B. K., & Jerard, R. B. (2012). *Sculptured surface machining: theory and applications*. Springer Science & Business Media.
6. Rawat, D. B., Brecher, C., Song, H., & Jeschke, S. (2017). *Industrial Internet of Things: Cybermanufacturing Systems*. Springer.
7. Gunal, Murat M. (Ed.) (2019). Simulation for Industry 4.0 Past, Present, and Future Series: Springer Series in Advanced Manufacturing.
8. Przybylski, W., & Deja, M. (2007). Komputerowo wspomagane wytwarzanie maszyn. *Warszawa: Wydawnictwo WNT*.
9. Deja, M., Dobrzyński, M., & Rymkiewicz, M. (2019). Application of Reverse Engineering Technology in Part Design for Shipbuilding Industry. *Polish Maritime Research*, *26*(2), 126-133.
10. Deja, M., & Siemiatkowski, M. S. (2018). Machining process sequencing and machine assignment in generative feature-based CAPP for mill-turn parts. *Journal of Manufacturing Systems*, *48*, 49-62.
11. Deja, M., Dobrzyński, M., Flaszyński, P., Haras, J., & Zieliński, D. (2018). Application of Rapid Prototyping technology in the manufacturing of turbine blade with small diameter holes. *Polish Maritime Research*, *25*(s1), 119-123.
12. Deja, M., & Siemiatkowski, M. S. (2013). Feature-based generation of machining process plans for optimised parts manufacture. *Journal of Intelligent Manufacturing*, *24*(4), 831-846.

Supplementary literature

Selected articles from the scientific journals available on-line, e.g. :

1. Computer-Aided Design
2. Computers in Industry
3. Journal of Micro and Nano Manufacturing
4. Journal of Mechanical Design
5. Journal of Manufacturing Systems

eResources addresses

Adresy na platformie eNauczanie:

Computer Aided Manufacturing Systems (M:320417W0) Mechatronika sem. 1, 2022/2023 lato - Moodle ID: 31062
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31062

Example issues/ example questions/ tasks being completed

- Development of CAD/CAM systems.
- Machine tool selections with high level of automation.
- Parts grouping.
- Modelling of manufacturing processes.
- Development trends of CAM systems: STEP NC.
- Intelligent manufacturing methods, smart manufacturing.
- Algorithms for automating the design of technological processes.

Work placement

Not applicable