GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Manufacturing Engineering, PG_00057858		
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	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	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	Acquainting with the subject of modern manufacturing, mainly mechanical components

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W09] knows general rules of individual and team work organisation as well as enterprise management that utilise knowledge in the area of technical sciences and science disciplines appropriate for mechatronics	Teamwork skills and knowledge of the rules related to manufacturing costs	[SW3] Assessment of knowledge contained in written work and projects
[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_U02] potrafi przygotować opracowanie naukowe w języku polskim i krótkie doniesienie naukowe w języku obcym dotyczące szczegółowych zagadnień z zakresu Mechatroniki, a także – dziedzin nauk technicznych i dyscyplin naukowych: Inżynieria Mechaniczna oraz Automatyka, Elektronika i Elektrotechnika, i pokrewnych, właściwych dla mechatroniki, przedstawiające wyniki własnych badań naukowych	Ability to critically analyze the newest professional literature	[SU3] Assessment of ability to use knowledge gained from the subject
[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
[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

Subject contents

Topics of lectures

1. Design and technological requirements in modern industry.
2. Industry 4.0 strategy.
3. Advanced Manufacturing processes: subtractive, additive and hybrid.
4. Comparison between additive and subtractive technologies.
5. Advanced machine tools and CNC centers for complete machining.
6. Technological stages.
7. Methods for the estimation of the cost of production.
8. Automated process planning for mechanical components of complex shape.
9. Tendencies in finishing operations.
10. Innovations in abrasive products for precision grinding.
11. Bio-design and bio-machining.
12. Automation of technological processes.
13. Tools for the quality control and advanced measurement techniques.
14. Modelling and simulation of technological processes.
15. AI in manufacturing engineering.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
colloquium at the end of the semester	50.0%	50.0%
mid-term colloquium	50.0%	50.0%

Recommended reading

Basic literature

1. Hitomi, K. (2017). Manufacturing Systems Engineering: A unified approach to manufacturing technology, productionmanagement, and industrial economics. Routledge.
2. Karkalos, N. E., Markopoulos, A. P., & Davim, J. P. (2019). Computational Methods for Application in Industry 4.0. Springer International Publishing.
3. Rao, R. V. (2010). Advanced modeling and optimization of manufacturing processes: international research and development. Springer Science & Business Media.
4. Rawat, D. B., Brecher, C., Song, H., & Jeschke, S. (2017). Industrial Internet of Things: Cybermanufacturing Systems. Springer.
5. Gunal, Murat M. (Ed.) (2019). Simulation for Industry 4.0 Past, Present, and Future Series: Springer Series in Advanced Manufacturing.

	Supplementary literature	Selected papers from journals available on-line : 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	Podstawowe https://www-1taylorfrancis-1com-1rrvalujs04bc.han.bg.pg.edu.pl/books/mono/10.1201/9780203748145/manufacturing-systems-engineering-katsundo-hitomi - Hitomi, K. (2017). Manufacturing Systems Engineering: A unified approach to manufacturing technology, production management, and industrial economics. Routledge. Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. The machine tool metrology: idea and examples 2. The main principles of Group Technology: advantages over other manufacturing strategies, examples 3. Advantages - disadvantages of cellular compared to functional layout in manufacturing 4. Classification of manufacturing systems depending on the flexibility 5. The idea of complete machining 6. The CIM concepts 7. Main elements of the Industry 4.0 strategy 8. The main sources of errors during manufacturing 9. Application of Petri Nets in the simulation of manufacturing 10. FMS constituents and examples of pertinent equipment used in FMS	
Work placement	Not applicable	