



Subject card

Subject name and code	Manufacturing Engineering, PG_00057858						
Field of study	Mechatronics						
Date of commencement of studies	February 2022	Academic year of realisation of subject			2021/2022		
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 Automatykacji Produkcji -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor						
	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_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_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_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_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		

Subject contents	<p>Topics of lectures</p> <ol style="list-style-type: none"> 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	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>colloquium at the end of the semester</td> <td>50.0%</td> <td>50.0%</td> </tr> <tr> <td>mid-term colloquium</td> <td>50.0%</td> <td>50.0%</td> </tr> </tbody> </table>			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%
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mid-term colloquium	50.0%	50.0%										
Recommended reading	<p>Basic literature</p>	<ol style="list-style-type: none"> 1. Hitomi, K. (2017). Manufacturing Systems Engineering: A unified approach to manufacturing technology, production management, 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. 										
	<p>Supplementary literature</p>	<p>Selected papers from journals available on-line :</p> <ol style="list-style-type: none"> 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 										
	<p>eResources addresses</p>	<p>Podstawowe</p> <p>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.</p>										
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 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											