



Subject card

Subject name and code	Computer Aided Manufacturing Systems, PG_00063000						
Field of study	Ocean Engineering						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		English		
Semester of study	3		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		Angelos Markopoulos				
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_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_W05] has an organized, widened knowledge on design, construction and operation of ocean technology objects and systems		Knowledge of the specifics of designing ocean technical facilities		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_U82] is able to proficiently obtain and process information related to field of study and academic environment in foreign language at B2+ level of the Common European Framework of Reference for Languages (CEFR)		Analysis of specialized literature in a foreign language		[SU4] Assessment of ability to use methods and tools		
	[K7_K02] is aware non-technical aspects and effects of operation as an engineer, its influence on the environment and is aware of the responsibilities for the decisions taken		Knowledge of ecological production methods		[SK1] Assessment of group work skills		
	[K7_W06] has an organized, widened knowledge on engineering methods and design tools allowing the conducting of advanced projects within the construction and operation of ocean technology objects and systems		Knowledge of modern methods of design and operation of marine facilities		[SW2] Assessment of knowledge contained in presentation		

Subject contents	<p>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.</p>		
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
	Presence during lectures	50.0%	50.0%
	Colloquium	50.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Karkalos, N. E., Markopoulos, A. P., & Davim, J. P. (2019). <i>Computational Methods for Application in Industry 4.0</i>. Springer International Publishing. 2. McMahon, C., & Browne, J. (1999). <i>CADCAM: principles, practice and manufacturing management</i>. Addison-Wesley Longman Publishing Co., Inc.. 3. Rao, R. V. (2010). <i>Advanced modeling and optimization of manufacturing processes: international research and development</i>. Springer Science & Business Media. 4. Scallan, P. (2003). <i>Process planning: the design/manufacture interface</i>. Elsevier. 5. Choi, B. K., & Jerard, R. B. (2012). <i>Sculptured surface machining: theory and applications</i>. Springer Science & Business Media. 6. Rawat, D. B., Brecher, C., Song, H., & Jeschke, S. (2017). <i>Industrial Internet of Things: Cybermanufacturing Systems</i>. Springer. 7. Gunal, Murat M. (Ed.) (2019). <i>Simulation for Industry 4.0 Past, Present, and Future Series: Springer Series in Advanced Manufacturing</i>. 8. Przybylski, W., & Deja, M. (2007). <i>Komputerowo wspomagane wytwarzanie maszyn. Warszawa: Wydawnictwo WNT</i>. 9. Deja, M., Dobrzyński, M., & Rymkiewicz, M. (2019). Application of Reverse Engineering Technology in Part Design for Shipbuilding Industry. <i>Polish Maritime Research</i>, 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. <i>Journal of Manufacturing Systems</i>, 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. <i>Polish Maritime Research</i>, 25(s1), 119-123. 12. Deja, M., & Siemiatkowski, M. S. (2013). Feature-based generation of machining process plans for optimised parts manufacture. <i>Journal of Intelligent Manufacturing</i>, 24(4), 831-846. 	
	Supplementary literature	<p>Selected articles from the scientific journals available on-line, e.g. :</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 	
	eResources addresses	<p>Adresy na platformie eNauczanie: Computer Aided Manufacturing Systems (M:320417W0) (PG_00063000) 2023-24 Summer Semester - Moodle ID: 36994 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36994</p>	

Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • 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