Subject card

Subject name and code	Computer aided maintenance of the stok of machines, PG_00005399						
Field of study	Management and Production Engineering, Management and Production Engineering						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2022/2023		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		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. Daniel Chuchała				
	Teachers		dr inż. Wojciech Blacharski				

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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	To familiarize students with the principles of selection of different strategies and organisation of maintenance systems in manufacturing plants. Presentation of the goals and possibilities of the computer aideding in maintenance. Introduction to the various categories of software for maintenance.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_U07		
	K6_W04		
	K6_W13		
	K6_W04		
	K6_W13		
	K6_U04		
	K6_U04		
	K6_K01		
	K6_U07		

Subject contents	LECTURE Definitions of plant maintenance (PM) and assets lifecycle management (ALM). Tasks, standardizing and law requirements in PM. Influence of PM for competitiveness of a plant. Specifics of PM in automated manufacturing. Traditional and modern approach to PM systems and strategy. Devideing of the PM tasks between own service and outsourcing. Rules of making a decision about repair, modernisation and replacement. Dependence between PM strategy, PM costs and operational ability of machines. Selection a strategy of PM. Indexes of efficiency in PM. Matching the PM organizing system with characteristic of a plant. Purposes and range of applying computer aiding in PM. Computer aided PM as a subsytem of computer integrated manufacturing (CIM). Categories of software for computer aided PM. Computer aided flow and archiving of the related to PM documents. Collecting data related to using machines, planing repairs, managing spare-parts, etc., by means of CMMS programs. EAM programs for managing the stock of machines and optimization their life-cycle. Applying HMI/SCADA software for automated collecting the data related to operation of a machine. Prevention against failures by applying computer based machine-safety technologies. Computer aiding of direct actions in PM, such as evaluation operational ability of a machine, diagnostics, commissioning, tuning, etc. "Teleservice" and other technologies of remote supported PM. Practical problems of implementation the computer aided PM: specifics of a plant, necessity of reorganizing, human factor, etc. Rules of forecasting the costs and future benefits of implementation a system of computer aided PM. LABORATORY 1.Programs for archiving and aiding the flow of the related to PM documents. 2.Operating and range of application of a CMMS program. 3.Scheduling a serie of inspection for a CNC machine tool by means of a CMMS program. 4.Computerised recording of machine hours and down-time for scheduling service actions and estimating the overal equipment effciency (OEE) index. 5.Monitoring of manufacturing machines and processes by means of HMI/SCADA systems. 6.Application of computerised data acquisition systems (DAQ) in PM. 7.Computer assistance in risk assessment in the workplace
Prerequisites and co-requisites	Basic knowledge related to manufacturing machines and technologies of manufacturing.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Practical exercise	100.0%	10.0%
final test	50.0%	90.0%

Recommended reading

Basic literature	1. Blacharski W.: "Computer aided maintenance" - a set of presentations for lectures. 2. Manulas for computer programmes used during exercises. 3. Publications conerning maintenance available in Internet.
Supplementary literature	1. Legutko S.: Podstawy eksploatacji maszyn i urządzeń. WSiP. 2007.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	The test contains a number of detailed questions to the whole range of lectures and laboratory exercises.
Work placement	Not applicable