GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Knowledge Engineering Systems, PG_00038296		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Specialty subject group Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Katedra Inteligentnych Systemów Sterowania i Wspomagania Decyzji -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Tomasz Rutkowski	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	10.0	0.0	20.0	0.0	0.0	30

E-learning hours included: 0.0

Adresy na platformie eNauczanie:

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	3.0	42.0	75

Subject objectives

Acquiring basic knowledge related to the knowledge engineering domain. Getting to know the selected knowledge engineering systems and methods. Acquiring the ability to properly use the known issues in the design and implementation of the expert system for the purposes of solving simple engineering and research problems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K06] is aware of the impact of engineering activities on the quality of applied solutions and the environment		
[K7_W05] has knowledge of artificial intelligence computing techniques, inference, learning and solution-finding methods in algorithmic terms applied to automation and robotics systems	The student is able to use selected methods of inference and artificial intelligence methods in projects. The student is able to use software tools such as: Matlab/ Simulink, RMSE, ECLiPSe Constraint Programming System.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects

Subject contents

LECTURE: Definitions and basic concepts in the field of knowledge engineering systems. Expert systems. Selected methods of knowledge acquisition and knowledge representation. Heuristics. Representation of problems and search space. Selected graph search techniques. Constraint logic programming paradigm. Examples of artificial intelligence methods in expert systems. Practical examples of functional applications implementation in Matlab/Simulink, RMES and ECLiPSe Constraint Programming System environments. TRAINING LABORATORY: Realization of the rules based on classical logic and fuzzy logic, creating simple graphical user interfaces in the Matlab/Simulink environment. Solving selected test problems with artificial intelligence methods. Solving selected test problems with an elementary and exact knowledge base for the RMES expert system shell. Basics of constraint logic programming solving selected test problems with ECLiPSe Constraint Programming System environment.

Prerequisites and co-requisites

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Lecture test</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>Laboratory exercise reports</td><td>50.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Hand D., Mannila H., Smyth P. (2005), Eksploracja danych. WNT, Warszawa.
2. Korbicz, J., Kościelny, J, Kowalczuk, Z., Cholewa, W. (2002), Diagnostyka procesów. Modele, metody sztucznej inteligencji, zastosowania. Wydawnictwa Naukowo Techniczne, Warszawa.
3. Koronacki J., Ćwik J. (2005), Statystyczne systemy uczące się. WNT, Warszawa.
4. Marriott K., Stuckey P.J. (1999), Programing with constraints. The MIT Press, London.
5. Mulawka J. (1996), Systemy ekspertowe. Wydawnictwa Naukowo Techniczne, Warszawa.</td></tr>
<tr><td>Supplementary literature</td><td>1. Osowski, S. (2000), Sieci neuronowe do przetwarzania informacji, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa.
2. Piegat, A. (1999), Modelowanie i sterowanie rozmyte, Akademicka Oficyna Wydawnicza EXIT, Warszawa.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">• Present and describe selected methods of knowledge representation
• Present and describe basic inference algorithms
• Present and briefly describe the structure of a typical expert system
• Briefly describe constraint logic programing paradigm</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.