SYLLABUS

Name: Knowledge Engineering and Expert Systems
Name in Polish: Inżynieria wiedzy i systemy ekspertowy
Name in English: Knowledge Engineering and Expert Systems

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Master degree
Term:	winter semester 2024/2025
Coordinator of course edition:	dr inż. Katarzyna Mleczko

Default type of course examination report:

Language:
English

Course homepage:
https://platforma.polsl.pl/roz/

ECTS
2

Short description:
The aim of the subject is to acquaint students with the key issues related to decision-making supported by computer systems based on artificial intelligence methods and tools. Additionally, the subject aims to cultivate in students an attitude characterized by independence in seeking and applying modern IT solutions and the ability to adapt them to an engineering problem that arises.

Description:
Course Content:
LECTURE

1. Knowledge Engineering and Expert Systems - Introductory Concepts.
2. Advisory Systems, Expert Systems, Knowledge-Based Systems - Key Concepts (definitions, structure, types, characteristics, examples).
3. Knowledge as a Fundamental Component of Advisory Systems. Types, acquisition methods, the role of knowledge engineers.
4. Methods for Knowledge Visualization and Representation. Semantic networks. Machine learning.
5. Chatbots as an Example of Artificial Intelligence-Based Tools Application.

PROJECT:
Development of a concept and a computer model for an artificial intelligence-based expert system supporting a selected engineering problem.

LABORATORY:
The aim of the classes is to develop a prototype of an expert system (ES) using the SAP Conversational AI platform.

1. Selection of an engineering problem within the scope of engineering activities suitable for support using an expert system.
2. Creation of source materials and materials for the knowledge base (KB) development.
3. Development of Intents, expressions, and entities forming the KB structure.
4. Creating dialog flows. Building ES skills.
5. Iterative chatbot training.
6. Dialog testing and analysis of response correctness.

Number of Contact Hours:
Lecture - 15 hours
Laboratory - 15 hours

Project - 15 hours

Number of Remaining Hours:
Project Work: 15 hours

Bibliography:

Russel S., Norvig P., Artificial Intelligence. A modern approach. PEARSON SERIES IN ARTIFICIAL INTELLIGENCE, 2022
Mleczko K.: Chatbot as a Tool for Knowledge Sharing in the Maintenance and Repair Processes, MAPE 2021, volume 4, issue 1, pp. 499-508; doi:10.2478/mape-2021-0045
Mleczko K.: Organization of knowledge resources for the development of a virtual assistant to inform the public about the SARS-Cov2 pandemic, W: Innovation management and sustainable economic development in the era of global pandemic : Proceedings of the 38th International Business Information Management Association Conference (IBIMA), 23-24 November 2021, Seville, Spain / Soliman K. S. (red.), Proceedings of the International Business Information Management Association Conference, 2021, vol. 38, International Business Information Management Association, s.7488-7493, ISBN 978-0-9998551-7-1

Learning outcomes:

KNOWLEDGE Knows and understands:
K2A_W06 Ordered and theoretically-grounded key issues in the field of decision-support and CAx systems.

SKILLS Is able to:
K2A_U03 When identifying and formulating specifications for engineering tasks and solving them:
-use analytical, simulation and experimental methods,
-see their systemic and non-technical aspects, including ethical issues,
-make a preliminary economic assessment of proposed solutions and undertaken engineering activities.
K2A_U09 Choose decision-support methods and use CAx systems.
K2A_U15 Independently plan and realize his/her lifelong learning and guide others in this regard.

SOCIAL COMPETENCE: is ready for
K2A_K02 Recognition of the importance of knowledge in solving cognitive and practical problems; consulting experts in the event of difficulties in solving the problem on his/her own.

Assessment methods and assessment criteria:

LECTURE:
To pass the lecture, it is a requirement to take the exam and achieve a minimum score threshold (50% + 1 point).

LABORATORY/PROJECT:
To pass the practical/lab sessions, ongoing tasks during the classes must be completed, and notes with results should be presented following the template provided by the instructor.

Make-up exam: The conditions for the make-up exam are identical to the regular exam. Two additional make-up dates will be arranged in agreement with the interested students

Practical placement: