COURSE DESCRIPTION CARD - SYLLABUS

Course name
Intelligent Management Support Systems [N1IZarz1>ISWZ]

Course

Field of study
Engineering Management

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
elective

Number of hours

Lecture
8

Laboratory classes
0

Other
0

Tutorials
10

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Student has knowledge of the foundations of management and information technology carried out at first-cycle studies. In addition, he should also be able to use the acquired knowledge in practice and is ready to work within team structures.

Course objective

To interest the students of Engineering Management course of the future of the application of expert systems and methods and techniques of artificial intelligence for the requirements of decision-making processes and management of the design, implementation and operation of systems: human communities - a technological and organizational component.

Course-related learning outcomes

Knowledge:
The student identifies various types of data and technologies used in intelligent management support systems, including artificial intelligence algorithms and cyber-physical systems [P6S_WG_01].
The student describes how the life cycle of socio-technical systems affects the implementation and operation of intelligent management support systems [P6S_WG_13].

The student lists and characterizes the basic principles and methods of quality management used in the context of intelligent management support systems [P6S_WK_02].

Skills:
The student analyzes the results of experiments and computer simulations related to intelligent management support systems, drawing conclusions about their effectiveness and applications [P6S_UW_09].
The student designs and implements solutions based on intelligent management support systems, using analytical methods and simulation tools [P6S_UW_10].
The student applies strategies and techniques to analyze and solve problems related to the implementation of intelligent management support systems in various organizational contexts [P6S_UW_11].

Social competences:
The student creates plans and strategies for the implementation of intelligent management support systems, taking into account various technical and organizational aspects [P6S_KO_02].
The student prepares recommendations on the ethical use of intelligent management support systems, considering their impact on the environment and society [P6S_KR_01].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lecture is verified by a test carried out after the last lecture. The test consists of 20 closed questions. Assessment threshold: 50% of the points (satisfactory).
Knowledge acquired as part of the exercises is verified on the basis of solving individual tasks covered by the curriculum. The student receives points for each task. Assessment threshold: 50% of the points (satisfactory).

Programme content

The program covers the following topics: information processing and searching, the use of BI systems, knowledge representation methods, data mining, the use of Expert Systems, introduction to artificial intelligence, neural networks and evolutionary algorithms.

Course topics

Lecture: The course consists of three main thematic modules. The first one concerns the issues of processing and searching: data, information, knowledge and wisdom, and against this background it introduces the concept of artificial intelligence in the context of applications in the economy based on intelligent digital technologies and in supporting management information systems. It familiarizes students with concepts such as: Business Intelligence System in enterprise management.
The second module covers the issue of acquiring knowledge. methods of knowledge representation, creation and reconstruction of professional knowledge bases, and strategies for expert and intelligent solution of decision-making management problems. This module is methodological in nature and deals with, among others, heuristics and graph search strategies, as well as classical and fuzzy inference methods in intelligent systems, supporting decision-making processes in the management of the design, implementation and operation of systems: human communities - technological and organizational component.
The third module is also descriptive and methodological in nature and concerns two types of selected artificial intelligence tools (artificial neural networks and evolutionary algorithms) supporting decision-making management processes. Expert Systems are presented in variants of decision-making solutions based on two-valued logic and as fuzzy systems. Artificial Intelligence solutions classified as based on imitation of nature (Computational Intelligence) include Artificial Neural Networks (in the variants: Self Organizing Maps and Learning Vector Quantization) and Evolutionary Algorithms (in the variants: Genetic Algorithms, Evolutionary Strategies, Evolutionary Programming).
Exercises: This type of classes is carried out in the form of a joint analysis of student, team-based practical studies for issues: a), b), c) and d) and a joint analysis of an exemplary issue e). The list of exercise topics includes: a) selected methods of symbolic representation of knowledge in the field of management engineering for the purposes of creating and rebuilding professional knowledge bases, b) methods of building and searching knowledge graphs in the field of management engineering, c) operations on

triangular and trapezoidal forms of membership functions for the purposes of inference in a fuzzy expert system of a selected management engineering issue, d) preparation of training programs in business management engineering under the threat of cyberattacks, e) use of MS Power BI software to build and interpret business reports.

Teaching methods

Information lecture in the form of a multimedia presentation, with elements of a conversational lecture. Classes: auditorium exercises, task solving and case study.

Bibliography

Basic:
1. Pacholski L., Systemy ekspertowe i sztuczna inteligencja, Wydawnictwo Politechniki Poznańskiej, Poznań 2011,
2. Flasiński M., Wstęp do sztucznej inteligencji, PWN, Warszawa 2011,
3. Zieliński J.S., (red.), Inteligentne systemy w zarządzaniu, PWN, Warszawa 2000,
4. Mulawka J.J., Systemy ekspertowe, WNT, Warszawa 1996.
5. Cytowski J., Algorytmy genetyczne. Podstawy i zastosowania, Akademicka Oficyna Wydawnicza, Warszawa 1996.

Additional:
1. Rutkowska D., Piliński M., Rutkowski L., Sieci neuronowe, algorytmy genetyczne i systemy rozmyte, PWN, Warszawa 1997,
2. Striving for excellence in AI implementation : AI maturity model framework and preliminary research results, Tanajura Ellefsen A.P., Joanna Oleśków-Szłapka J., Pawłowski G., Toboła A., LogForum 2019
3. Medsker L.M., Hybryd Neural Networks and Expert Systems, Kluwer Academic Publisher, Boston 1994.
4. Żurada J.M., Barski M., Jędruch W., Sztuczne sieci neuronowe, PWN, Warszawa 1996.
5. Budrewicz J., Fraktale i chaos, WNT, Warszawa 1993.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	20	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00