STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Expert Systems and Artificial Intelligence (AI)	**1011102221011116442**

Field of study	Profile of study (general academic, practical)	Year /Semester
Safety Engineering - Full-time studies - Second-	**(brak)**	**1 / 2**
Elective path/specialty	**Subject offered in:**	**Course (compulsory, elective)**
Ergonomics and Work Safety	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **30** Classes: **15** Laboratory: **-** Project/seminars: **-**	**4**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student knows the basics of management, basics of information technology in management
2	**Skills**	Student is able to use the terms of management and computer science.
3	**Social competencies**	Student is aware of the need to expand his knowledge and is willing to work in a group.

Assumptions and objectives of the course:

Students are interested in Safety Engineering, the application of expert systems, methods and artificial intelligence in safety engineering.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows the concepts such as artificial neural networks and evolutionary algorithms and their applications, as well as issues of hybrid systems and theory of chaos, the concept of ,,intelligent,, dilemma of the sixth cycle - [K2A_W20]

2. Student knows the methods of acquiring knowledge, methods of knowledge representation, development and reconstruction of professional knowledge bases as well as strategies of problem-solving - [K2A_W23]

Skills:

1. Student can acquire, integrate, interpret data from literature, database or other properly matched sources, as well as to draw conclusions, formulate and justify opinions - [K2A_U1]

2. Student can apply various techniques in order to communicate in occupational environment and other environments. - [K1A_U2]

3. Student an create, both in English and Polish language, a well- documented report of problems within Safety Engineering, which present the results of their own research. - [K2A_U3]

4. Student can prepare and give oral presentation relating to detailed issues within the realm of Safety Engineering in Polish and other foreign language. - [K2A_U4]

5. Student has self-study ability and comprehends it - [K2A_U5]

6. Student can apply information-communicative techniques to deal with tasks that are typical of engineering activity. - [K2A_U7]

7. Student can, while formulating and solving engineering tasks, discern their systemic and non-technical aspects and also socio-technical, organizational and economic approach. - [K2A_U10]

8. Student can come up with a suggestion how to make use of state-of-the art technology (techniques and technology) within products design. - [K2A_U12]

9. Student can suggest some improvements of already existing technical solutions that are typical of Safety Engineering. - [K2A_U16]

10. Student can, according to the given specification, design and operate on a simple equipment, system or a process, which is typical of Safety Engineering, using appropriate and groundbreaking methods, techniques and tools. - [K2A_U19]

Social competencies:

1. Student understands the need and knows means how to self-study (first, second and third cycle studies, postgraduate studies, qualification courses)- improving professional, personal and social competence; can argument the need to learn for the whole life. - [K2A_K1]

2. Student is fully aware of the responsibility that he has taken for his own work and expresses readiness to comply with the rules of team work as well as responsibility for mutually realized and completed tasks. - [K2A_K3]

3. Student can determine some causal relationships in the process of targets implementation and rank pertinence of alternative or competitive tasks. - [K2A_K4]

Assessment methods of study outcomes

Formative assessment:

Classes: based on thematic team work

Lectures: on the basis of written or oral answers from the current and previous material covered during the lectures

Collective assessment:

Classes: on the basis of a written verification of the degree of knowledge, on the basis of thematic collaborative studies

Lectures: on the basis of an oral exam within the knowledge specified in the subject description

Course description

The subject consists of five thematic modules. The first one concerns the intelligence issues in general, information processing, and the concept of artificial intelligence in a robotic context as well as information systems management and safety engineering. The dilemma of the sixth business cycle. The second and third modules involve the issue of acquiring knowledge, methods of knowledge representation, development and reconstruction of professional knowledge bases as well as strategies of problem- solving. These modules have a methodological nature and treat, inter alia, about heuristics and strategies of graphs searching as well as collision of classic and fuzzy inference methods. Fourth and fifth modules are of utility. They present selected artificial intelligence tools such as: artificial neural networks and evolutionary algorithms. They submit their applications in the management and safety engineering. They also deal with the issues of hybrid systems and chaos theory.

Basic bibliography:

1. Pacholski L., Systemy ekspertowe i sztuczna inteligencja (Expert systems and artificial intelligence). Wyd. PP, Poznań 2011

2. Inteligentne systemy w zarządzaniu (Intelligent systems in management). Zieliński J.S., (red.), PWN, Warszawa 2000.

3. Mulawka J.J., Systemy ekspertowe (Expert systems). WNT, Warszawa 1996.

4. Rutkowska D., Piliński M., Rutkowski L., Sieci neuronowe, algorytmy genetyczne i systemy rozmyte (Neural networks, genetic algorithms, and fuzzy systems). PWN, Warszawa 1997.

5. Cytowski J., Algorytmy genetyczne. Podstawy i zastosowania. (Genetic algorithms. Fundamentals and applications). Akademicka Oficyna Wydawnicza, Warszawa 1996

6. Medsker L.M., Hybryd Neural Networks and Expert Systems, Kluwer Academic Publisher, Boston 1994

7. Żurada J.M., Barski M., Jędruch W., Sztuczne sieci neuronowe (Artificial neuron networks). PWN, Warszawa 1996

8. Budrewicz J., Fraktale i chaos. WNT, Warszawa 1993

Additional bibliography:		
Result of average student's workload		
Activity		**Time (working hours)**
1. Participation in lectures		30
2. Participation in classes		15
3. Preparation for an exam		20
4. Preparation for classes		15
5. Preparation for a thematic collaborative report		25
6. Exam		2
7. Overview of the exam results		2
8. Consultations		20
Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	129	4
Contact hours	69	3
Practical activities	36	1