

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Knowledge Engineering		Code 1010332431010330400
Field of study Information Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty Information Technologies	Subject offered in: polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: 1 Project/seminars: -		No. of credits 5
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 5 100%
Responsible for subject / lecturer: dr inż. Beata Jankowska email: beata.jankowska@put.poznan.pl tel. +48 61 665 37 24 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student has a knowledge of advanced programming techniques and methods.
2	Skills	Student can model and analyse computing systems; when formulating and solving computer problems, he/she can integrate the knowledge from different domains and fields of science.
3	Social competencies	Student can think and work creatively and enterprisingly.
Assumptions and objectives of the course: providing students with: the knowledge of different formal methods of knowledge representation (both certain and uncertain) and different techniques of knowledge acquisition, including - machine learning; the ability to design and implement small expert systems.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student has an organized and theoretically grounded knowledge of data integration and exploration. - [K_W07]		
2. Student knows problems of knowledge engineering and the methods of their solving. - [K_W09]		
Skills:		
1. In a team, a student can design and implement particular modules of non-standard or complex information systems. - [K_U09]		
2. Student can propose and justify improvements of the existing information solutions. - [K_U12]		
Social competencies:		
1. Student realises the necessity to inform general public about achievements of computer science and other aspects of computer engineers' activities; he/she makes an effort to give information clearly, by exposing different points of view. - [K_K02]		
Assessment methods of study outcomes		
Lecture: written exam consisting of theoretical questions and simple problems to solve. Labs: rating a student's solution of a group project task (oral report, implementation in an appropriate programming language/environment, written specification); rating a student's activity in class discussions and solving lab problems. More than 50% points are necessary for passing the exam and labs.		

Course description		
<p>Lectures. The notions of data, information and knowledge. Main rules of knowledge engineering. Sources of knowledge and classical techniques of knowledge acquisition. Methods of certain and uncertain knowledge representation. Reasoning methods. Machine learning algorithms. Expert systems and their usage in diagnostics, classification, construction, prediction and simulation. Medical expert systems.</p> <p>Labs. Programming environments for developing expert systems (CLIPS, FuzzyCLIPS, JESS, NEURONIX, NETICA). Designing and implementing small expert systems with certainty/uncertainty.</p>		
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Rutkowski L., Metody i techniki sztucznej inteligencji, wydanie 2, Wydawnictwa Naukowe PWN, 2009. 2. Jagielski J., Inżynieria wiedzy, Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, 2005. 3. Russell S.J., Norvig P., Artificial Intelligence: A Modern Approach (3rd edition), Prentice Hall, 2010. 		
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Ligęza A., Foundations for Rule-Based Systems, Springer Series: Studies in Computational Intelligence, 2006. 2. Tadeusiewicz R., Sieci neuronowe, Akademicka Oficyna Wydawnicza RM, Warszawa 1993. 3. Techniki informacyjne w badaniach systemowych (red. Kulczycki P., Hryniewicz O., Kacprzyk J.), WNT, 2008. 4. Giarratano J.C., Riley G.D., Expert Systems: Principles and Programming (4th Edition), PWS Publishing Company, 2004. 		
Result of average student's workload		
Activity	Time (working hours)	
1. Lectures	15	
2. Labs	15	
3. Final exam and consultations	20	
4. Preparing for labs	10	
5. Expert system architecture - literature study and design	20	
6. Expert system implementation	25	
7. Preparing for the final exam	20	
Student's workload		
Source of workload	hours	ECTS
Total workload	125	5
Contact hours	50	2
Practical activities	50	2