1.3. Module/ course form

To be completed by Course Team							
	Module name : **ARTIFICIAL INTELLIGENCE**					Module code:M22	
	Course name: **Artificial Intelligence**					Course code:	
	Faculty: **Institute of Applied Informatics**						
	Field of study: **Informatics**						
	Mode of study : **full-time**		Learning profile: **PRACTICAL**			Speciality:	
	Year/ semester: **3/6**		Module/ course status: **obligatory**			Module/ course language:**english**	
	Type of classes	lecture	lessons	lab	project	tutorial	other (please specify)
	Course load	**30**		**30**			

Module/ course coordinator	**dr inż. Jacek Paluszak**
Lecturer	**dr inż. Jacek Paluszak, dr inż. Henryk Olszewski**
Module/ course objectives	Introduction to methods of computers support thinking in proving, natural language processing and expert systems.
Entry requirements	familiarity with any programming language, mathematical culture at a good high school mat. and physics.

LEARNING OUTCOME		
Nr	LEARNING OUTCOME DESCRIPTION	Learning outcome reference
	Knowledge	
01	has a general knowledge of artificial intelligence and its use in programming robots,	K_W06,
02	has a general knowledge about the evolutionary computations,	K_W06,
03	has a detailed knowledge of programming robots,	K_W10, K_W15
	Skills	
04	can build intelligent rules that govern human behavior and models of these behaviors,	K_U07, K_U08
05	can build one-way, multi-layered neural networks,	K_U07, K_U16
06	can use neural networks in robotics,	K_U07, K_U16
	Social competence	
07	He understands the need and know the possibilities of continuous training in the field of developing artificial intelligence systems, leading to the lifting of professional competence, personal and social.	K_K01
08	He is aware of responsibility for own work and willingness to comply with the principles of teamwork,	K_K04
09	He is aware of the social role of technical college graduate.	K_K06, K_K03

CURRICULUM CONTENTS

Lecture

The essence of intelligence. Is the machine can think? Difficulties in defining intelligence. Turing test. Eliza program. The issue of prediction of the behavior of the computer. Information about Gödel theorem and its consequences.
Classical problems of artificial intelligence:

- Playing games.
  Tree game. Minimax strategy. Heuristic strategies. Cutting brunches. Learning by weight change.
- Natural Language Processing:
  Klasyfikacja Chomsky. Syntactic analysis. Semantic problems.
- Automatic theorem proving:
  Symbolic computation in mathematics. Assertions based on complete induction. Information about symbolic integration.
- Image recognition and manipulation of objects.

Programming languages specialized in artificial intelligence - the imperative languages, functional and logical: LISP, PROLOG.

Ways of reasoning about the behavior of programs. Knowledge representation - Rama. Information about reasoning systems of true sentences. The rules of inferences. Expert systems. Types of expert systems. Skeletal systems. Overview of the systems and their applications.
Tutorial
Examples of solutions in the space of states. Strategies Games: double games, minimax algorithm, alpha-beta cutoff Inference in logic: representation of the problem and knowledge related to the problem, calculus, testing satisfiability, the logic of the first order, the resolution method, theorem proving Planning: STRIPS and ADL representation, forward-chaining and backward-chaining algorithms, planning by bringing to the problem of satisfiability, hierarchical planning, decomposition planning, planning by analogy (Prodigy system), planning based on temporal logic (TAL system Planner), learning by removing. Machine learning: symbolic learning (rule induction algorithm), decision trees, neural networks (back propagation algorithm), Bayesian networks, learning from examples (k-nearest neighbors algorithm), reinforcement learning. Specialist applications: natural language processing, face recognition, robotics, multi-agent systems.

Basic literature	1. D. Harel. *Rzecz o istocie informatyki -- Algorytmika* (rozdz. 12). WNT, Warszawa 2001. ISBN 83-204-2688-X. 2. L. Goldschlager, A.Lister. *Computer Science A modern introduction* 3. Artificial Intelligence: a modern approach, S. Russell, P. Norvig, Prentice-Hall 1995 4. Artificial Intelligence: structures and strategies for complex problem solving, G. Luger, Addison Wesley 1997
Additional literature	

Teaching methods	1) lecture / lecture with multimedia presentation 2) exercises in laboratory with implementation of the project method for practical tasks

Assessment method	Learning outcome number
Tests with practical and theoretical part	01,02,03,04,05,06,07, 08,09
Practical tasks in laboratory	06,08

Form and terms of an exam	Parts of course evaluation: 50% course exam, 50% laboratory score: tests and practical tasks

STUDENT WORKLOAD	
	Number of hours
Participation in lectures	30
Independent study of lecture topics	10
Participation in tutorials, labs, projects and seminars	30
Independent preparation for tutorials*	40
Preparation of projects/essays/etc. *	
Preparation/ independent study for exams	10
Participation during consultation hours	5
Other	2
TOTAL student workload in hours	127
Number of ECTS credit per course unit	**5 ECTS**
Number of ECTS credit associated with practical classes	70 **2,8 ECTS**
Number of ECTS for classes that require direct participation of professors	67 **2,7 ECTS**