I007	FIN - elective – Semester 4 MR, IPM - obligatory – Semester 4	**Basics of Artificial Intelligence**	L+P+S 2+2+0	ECTS 6

Course objectives To introduce students to the theory and application of artificial intelligence techniques.

Course prerequisites. Linear Algebra, Multivariable Calculus, Introduction to Probability and Statistics, Introduction to Data Structures and Algorithms, Mathematical Tools.

Syllabus.

1. Introduction. Foundations and history of artificial intelligence. Intelligent agents.
2. Problem solving. Solving problems by searching. Search strategies (unsupervised, supervised, heuristic, recurrent, competitive).
3. Knowledge and reasoning. Logical agents. First-order logic. Inference in first-order logic. Knowledge representation.
4. Planning. Planning and acting in the real world.
5. Uncertain knowledge and reasoning. Probabilistic reasoning. Making simple decisions. Making complex decisions.
6. Learning. Supervised, unsupervised and supported learning. Learning by observation. Statistical learning methods.

Expected learning outcomes.

After completing the course, students will be able to:

- Discuss the term of intelligent agent;
- Explain and compare different strategies of searching the state space;
- Implement simple procedures of automatic reasoning and apply them to simple logic problems;
- Compare different approaches to planning;
- Illustrate different ways of learning;
- Resume possibilities, limitations and philosophical aspects of artificial intelligence.

Teaching methods and student assessment. Lectures and exercises are obligatory. The exam consists of a written and an oral part, and and it is taken after completion of lectures and exercises. Acceptable mid-term exam scores replace the written examination. Students may influence their final grade by doing homework or writing seminar papers during the semester.

Can the course be taught in English: Yes.

Basic literature:

1. S. J. Russell, P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall; 3rd edition, New Jersey, 2010.

Recommended literature:

1. G. F. Luger. Artificial Intelligence: Structures and Strategies for Complex Problem Solving. Addison-Wesley, 2005.
2. T. M. Mitchell. Machine Learning. McGraw-Hill, New York, 1997.
3. C. Bishop, Neural Networks and Machine Learning, Springer Verlag, Berlin, 1998..
4. D. Graupe, Principles of Artificial Neural Networks (2nd edition), Advanced Series in Circuits and Systems Vol. 6, World Scientific, Singapore 2007.
5. D.W.Patterson, Introduction to Artificial Intelligence and Expert Systems, Prentice Hall, London, 1990.