**Artificial Intelligence (ECTS credits: 6)**

Language: the course is offered in English, Serbian and Hungarian.

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**Course description:**

The course is oriented toward basic principles of artificial intelligence. The course starts with historical overview and basic definitions in artificial intelligence. In the following part, problem solving search techniques are covered in detail. The following part covers Constraint Satisfaction Problems (CSP). Each topic is presented by using a bunch of examples. Game theory with optimal decision making is the following subject. The Minimax algorithm with Alpha-beta pruning is explained. In the next part of the course students are introduced to nature-based algorithms such as Genetic Algorithms (GA), Particle Swarm Optimization (PSO) and Ant Colony Optimization (ACO). In the last part of the course basic principles of Neural Networks are covered. Supervised and unsupervised learning methods are introduced with the perceptron learning rule, the backpropagation algorithm and Kohonen network. In the practical part of the course students write their own programs to solve artificial intelligence problems.

The course covers the following topics in Artificial Intelligence:

1. Introduction
2. Uninformed Search
3. Heuristics
4. Informed Search
5. Local Search
6. Constraint Satisfaction Problems
7. Game Theory
8. Optimal Decision Making in Games
9. Nature Based Algorithms
10. Genetic Algorithms (GA)
11. Particle Swarm Optimization (PSO)
12. Ant Colony Optimization (ACO)
13. Introduction to Neural Networks
14. Supervised Learning - Perceptron learning rule, Backpropagation
15. Unsupervised Learning - The Kohonen network

**Aims:**

The goal of this introductory course to artificial intelligence is to give a basic overview of the field. By the end of the course students will have a knowledge to recognize which algorithm to use for which problem. Students will be able to write their own programs to solve problems of artificial intelligence. They will be also introduced to learning principles of neural networks.