1. **Course title:** BIOLOGICALLY INSPIRED ARTIFICIAL INTELLIGENCE

2. **Course code**

3. **Validity of course description:** 2018/2019

4. **Level of studies:** 1st cycle of higher education

5. **Mode of studies:** intramural studies

6. **Field of study:** Computer science

7. **Profile of studies:**

8. **Programme:** ALL

9. **Semester:** 6

10. **Faculty teaching the course:** Institute of Computer Science

11. **Course instructor:** dr hab. inż. Krzysztof Cyran, dr inż. Grzegorz Baron

12. **Course classification:** common

13. **Course status:** compulsory

14. **Language of instruction:** English

15. **Pre-requisite qualifications:** Computer Programming, Mathematical Analysis, Linear Algebra, Statistical Methods

16. **Course objectives:**
The goal of the course is to present methods of artificial intelligence which fundamentals are derived from nature. The methods of computational intelligence like Artificial Neural Networks, Genetic Algorithms, Evolutionary Algorithms will be presented. Biologically inspired methods are examples of nonclassical methods of data processing in parallel connectionist systems like Artificial Neural Networks or evolutionary and genetic algorithms. Student can expand his knowledge about IT from simple computer science to general information processing science.

17. **Description of learning outcomes:**

<table>
<thead>
<tr>
<th>Nr</th>
<th>Learning outcomes description</th>
<th>Method of assessment</th>
<th>Teaching methods</th>
<th>Learning outcomes reference code</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>Student has general knowledge about artificial intelligence algorithms</td>
<td>PS</td>
<td>WT, P</td>
<td>K1A_W09</td>
</tr>
<tr>
<td>W2</td>
<td>Student has knowledge about methods and tools suitable for solving simple artificial intelligence tasks</td>
<td>PS</td>
<td>WT, P</td>
<td>K1A_W15</td>
</tr>
<tr>
<td>U1</td>
<td>Student can plan and execute experiments, interpret results and formulate conclusions</td>
<td>PS</td>
<td>P</td>
<td>K1A_U10</td>
</tr>
<tr>
<td>K1</td>
<td>Student can cooperate in workgroup</td>
<td>Teacher’s observations</td>
<td>P</td>
<td>K1A_K02</td>
</tr>
</tbody>
</table>

18. **Teaching modes and hours**

**Lecture / BA / MA Seminar / Class / Project / Laboratory**

Lecture 30h, Project 30h
19. Syllabus description:
Lecture: introduction to evolutionary algorithms and artificial neural networks, genetic algorithms, evolutionary algorithms, evolutionary strategies, evolutionary programming, chromosomes and schemas, genetic operators: selection, crossover, mutation, selection types, building block hypothesis, comparison of genetic and evolutionary algorithms, chromosome coding
Project: During the project students are obliged to solve the chosen problem using one or more of the methods of artificial intelligence. They have to develop the computer program solving the problem. They also can use existing programs or libraries for solving more complicated AI problems. Students can suggest the task themselves or can chose it from the presented list. Students work in 2-4 person groups. The general problem is divided into some separated subproblems for each student. Quality of final solution and cooperation of students are taken into consideration when the final mark is calculated.

20. Examination: NO

21. Primary sources:

22. Secondary sources:
5. T. Masters, Sieci neuronowe w praktyce, WNT 1996
23. Total workload required to achieve learning outcomes

<table>
<thead>
<tr>
<th>Lp.</th>
<th>Teaching mode :</th>
<th>Contact hours / Student workload hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>30/5</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>/</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>/</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>30/55</td>
</tr>
<tr>
<td>5</td>
<td>BA/ MA Seminar</td>
<td>/</td>
</tr>
<tr>
<td>6</td>
<td>Other</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>60/60</td>
</tr>
</tbody>
</table>

24. Total hours: 120

25. Number of ECTS credits: 4

26. Number of ECTS credits allocated for contact hours: 2

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 1

26. Comments:

Approved:

…………………………………………………………………………………
(date, Instructor’s signature)

…………………………………………………………………………………
(date, the Director of the Faculty Unit signature)