COURSE DESCRIPTION

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

3. **Validity of course description:** 2012/2013
4. **Level of studies:** 1st cycle of higher education
5. **Mode of studies:** intramural studies
6. **Field of study:** Computer science  
   (FACULTY SYMBOL) RAU
7. **Profile of studies:** general
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>1.</td>
<td>Student has general knowledge about artificial intelligence algorithms</td>
<td>Report from the project</td>
<td>Lecture and project</td>
<td>K_W11</td>
</tr>
<tr>
<td>2.</td>
<td>Student has knowledge about methods and tools suitable for solving simple artificial intelligence tasks</td>
<td>Report from the project</td>
<td>Lecture and project</td>
<td>K_W18</td>
</tr>
<tr>
<td>3.</td>
<td>Student can plan and execute experiments, interpret results and formulate conclusions</td>
<td>Report from the project</td>
<td>Project</td>
<td>K_U13</td>
</tr>
<tr>
<td>4.</td>
<td>Student can cooperate in workgroup</td>
<td>Teacher’s observations</td>
<td>Project</td>
<td>K_K03</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
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</th>
<th>Student workload hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>30/55</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>BA/ MA Seminar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>60/60</td>
<td></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): 2

26. Comments:

Approved:

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(date, Instructor’s signature)  (date, the Director of the Faculty Unit signature)