**Course Description**

1. Course title: DISTRIBUTED COMPUTER SYSTEMS
2. Course code: DCS

3. Validity of course description: 2017/2018

4. Level of studies: MSc programme, 2nd cycle of higher education

5. Mode of studies: intramural studies

6. Field of study: MACROFACULTY

7. Profile of studies:

8. Programme:

9. Semester: II

10. Faculty teaching the course: Faculty of Automatic Control, Electronics and Computer Science

11. Course instructor: PhD Rafał Cukep

12. Course classification: computer science (informatics)

13. Course status: compulsory

14. Language of instruction: English

15. Pre-requisite qualifications: computer networks and computer programming on the level taught at BA courses

16. Course objectives: To achieve skills in the designing distributed computer systems with the focus on soft real-time and hard real-time applications.

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 gets knowledge on models of distributed computer systems including hardware configuration, data flow and tasks distribution</td>
<td>test</td>
<td>Lecture, class</td>
<td>K2A_W05</td>
</tr>
<tr>
<td>2.</td>
<td>Student acquires knowledge on cooperative collaboration in distributed computers systems with focus on agent and holon based systems used in industrial applications</td>
<td>test</td>
<td>Lecture, class</td>
<td>K2A_W05, K2A_W11</td>
</tr>
<tr>
<td>3.</td>
<td>Student gets knowledge on distributed, object oriented information modeling including using meta-information and object oriented context information presentation, distributed information processing and collaborative services</td>
<td>test, discussion</td>
<td>Lecture, class</td>
<td>K2A_W10, K2A_W15</td>
</tr>
<tr>
<td>4.</td>
<td>Student is able to design and prepare service and agent based distributed computer systems</td>
<td>laboratory reports</td>
<td>laboratory exercises</td>
<td>K2A_U01</td>
</tr>
<tr>
<td>5.</td>
<td>Student is able to design and prepare distributed address space and communication channels including soft and hard real-time communication, converting raw process data into information, that can be used in Business Intelligence systems</td>
<td>laboratory reports</td>
<td>laboratory exercises</td>
<td>K2A_U01, K2A_U06</td>
</tr>
<tr>
<td>6.</td>
<td>Student is able to apply selected Data Mining methods and tools in order to process information available in distributed computer system</td>
<td>laboratory reports</td>
<td>laboratory exercises</td>
<td>K2A_U01, K2A_U01</td>
</tr>
</tbody>
</table>

18. Teaching modes and hours

Lecture / Laboratory

Sem 2 - 30/30 h
19. Syllabus description:
Problems related with systems distribution, time constrained communication, task scheduling, monitoring and formal system description are presented. The lecture concerns on reliability, scalability and efficiency problems in large scale distributed computer systems used in industrial applications. There is a special focus given to make system well efficient and kip required timing constraints. The lecture describes system on model level, and shows many practical examples as well.

The laboratory part is focused on industrial application use cases including the distributed middleware level that joins: control, HMI (Human Machine Interface), MES (Manufacturing Execution Systems) and BI (Business Intelligence) parts. The OPC UA Client & Server SDK is used in order to present vertical data exchange issues in distributed industrial systems.

The Rapid Miner environment is used in order to demonstrate data mining methods and tools available to process information collected in distributed computer system.

20. Examination: no examination

21. Primary sources:

22. Secondary sources:

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>30/30</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>/</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>30/30</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>/</td>
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<tr>
<td>5</td>
<td>BA/MA Seminar</td>
<td>/</td>
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<tr>
<td>6</td>
<td>Other</td>
<td>/</td>
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<tr>
<td></td>
<td>Total number of hours</td>
<td>/</td>
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</tbody>
</table>

24. Total hours: 60

25. Number of ECTS credits: 5

26. Number of ECTS credits allocated for contact hours: 2.5

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 2.5

26. Comments: Approved:

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