**COURSE DESCRIPTION**

1. **Course title**: Real-time Operating Systems

2. **Course code**: ROS

3. **Validity of course description**: 2019/2020

4. **Level of studies**: 2nd cycle of higher education

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

6. **Field of study**: Informatics

7. **Profile of studies**: general academic

8. **Specialty**: Industrial Informatics Systems

9. **Semester**: III

10. **Faculty teaching the course**: Institute of Informatics

11. **Course instructor**: Rafał Cupek, PhD, DSc

12. **Course classification**: common courses

13. **Course status**: obligatory

14. **Language of instruction**: English

15. **Pre-requisite qualifications**: It is assumed, that the student has a basic knowledge of computer networks, operating systems and embedded devices in subjects of 1st cycle of higher education and preceding courses in Informatics.

16. **Course objectives**: The aim of the course is to familiarize students with the architecture and functionality of real-time operating systems.

17. **Description of learning outcomes**:

<table>
<thead>
<tr>
<th>No.</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>The student knows the principles of modeling and analysis of real-time operating systems and related artifacts.</td>
<td>Test, reports</td>
<td>Lectures, laboratory</td>
<td>K2A_W05</td>
</tr>
<tr>
<td>2</td>
<td>The student has knowledge of algorithms and software used in real-time operating systems.</td>
<td>Test, reports</td>
<td>Lectures, laboratory</td>
<td>K2A_W14</td>
</tr>
</tbody>
</table>
The student can analyze the way of functioning and evaluate existing solutions used in real-time operating systems.

The student is able to assess the usefulness and the possibility of using new technologies in projects related to the use of real-time operating systems.

18. Teaching modes and hours
Lecture: 15 h., Class: -, Laboratory: 15 h.

19. Syllabus description:

Lecture:
Presentation of the structure and functions of real-time operating systems, presentation of the use cases of these systems and problems encountered in industrial applications. Detailed presentation of issues:

- Serialization of periodic and aperiodic tasks
- Stochastic analysis of tasks on priorities
- Resource management in SOCR
- Reliability, availability and redundancy
- Communication in distributed real-time operating systems
- Model based on components according to IEC 61499

Laboratory:

- Resource management in real-time operating systems
- Scheduling tasks in real-time operating systems
- Communication in distributed real-time operating systems
- Testing the effectiveness and efficiency of redundant RT-applications

20. Examination: no

21. Primary sources:
22. Secondary sources:
   1. Richard Zurawski: The Industrial Information Technology Handbook

23. Total workload required to achieve learning outcomes

<table>
<thead>
<tr>
<th>No.</th>
<th>Teaching mode :</th>
<th>Contact hours / Student workload hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>15 / 15</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>- / -</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>15 / 15</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>- / -</td>
</tr>
<tr>
<td>5</td>
<td>BA/ MA Seminar</td>
<td>- / -</td>
</tr>
<tr>
<td>6</td>
<td>Other (exam)</td>
<td>- / -</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>30 / 30</td>
</tr>
</tbody>
</table>

24. Total hours: 60

25. Number of ECTS credits: 2 (sem. III)

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

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

28. Comments:

Approved:

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