1. **Course title**: SPECIALIZED OPERATING SYSTEMS

2. **Course code**: SOS

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

4. **Level of studies**: BA, BSc programme

5. **Mode of studies**: INTRAMURAL STUDIES

6. **Field of study**: INFORMATICS

7. **Profile of the studies**: comprehensive

8. **Specialty**: ALL

9. **Semester**: V, VI

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

11. **Course instructor**: Błażej Adamczyk  
    **Laboratory course instructor**: Aleksandra Gruca

12. **Course classification**: common courses

13. **Course status**: obligatory

14. **Language of instruction**: English

15. **Pre-requisite qualifications**: Operating systems, Fundamentals of computer programming

16. **Course objectives**: The goal of the course is to introduce students into the topics related to a key characteristics, architecture and services of specific operating systems such as distributed operating systems or real-time operating systems and virtual machine monitors. Laboratory classes are focused on solving advanced problems related to configuration, administration and management of server operating systems. The students attending to the course should have knowledge about basic concepts and problems related to operating systems and theory of computer science. Pre-requisite subjects are operating systems, theory of computer science and fundamentals of computer programming.

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 acquires knowledge on fundamentals of specific and distributed operating systems operating systems</td>
<td>final test</td>
<td>lecture</td>
<td>K1A_W10, K1A_W11, K1A_W13, K1A_W14, K1A_W13</td>
</tr>
<tr>
<td>2.</td>
<td>Student acquires practical knowledge about Linux and Windows operating systems</td>
<td>laboratory tasks</td>
<td>laboratory</td>
<td>K1A_U08, K1A_U21, K1A_U29</td>
</tr>
</tbody>
</table>
3. **Student acquires practical knowledge and basic skills in configuring operating systems for server-related tasks**

   laboratory tasks  

   KIA_U19  

   KIA_U21

4. **Student acquires knowledge and basic skills in administer and managing server operating systems**

   laboratory tasks  

   laboratory  

   KIA_U10  

   KIA_U19  

   KIA_U21

5. **Student acquires knowledge and basic skills in reading reference literature and technical documentation**

   laboratory tasks  

   laboratory  

   KIA_U01

18. **Teaching modes and hours**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Classes</th>
<th>Laboratory</th>
<th>Project</th>
<th>BA/MA Seminar</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>-</td>
<td>30</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Lectures**

The aim of the course is to introduce students to the concepts of general and specific-purpose operating systems, their functions, architectures, resource management methods, process synchronization, file systems and communication protocols. Subject covers the basic concepts of distributed (network) operating systems and specific-purpose systems such as virtualization systems, real-time operating systems, multimedia operating systems and embedded systems. In particular, the following aspects of operating systems are discussed: problems of time management in distributed, real-time and multimedia operating systems. Techniques of clock synchronization in computer systems. Resource management methods, scheduling and synchronization in distributed and specific-tasks operating systems. Issues related to security and reliability of operating systems. Real-time processes and processing time requirements. Selected algorithms dedicated to processor and memory management in real-time and distributed systems. QNX as an example of real-time operating system. Concepts of virtualization systems including details about Xen Hypervisor. Basic concepts related to multimedia operating systems. Multimedia streaming, compression, QoS (quality of service) parameters. Multimedia operating systems requirements, methods of processor and memory management. Basic concepts, function and architecture of embedded operating systems.

**Laboratory:**

1. Linux - access control list (ACL)
2. Programming in Linux
3. Linux - dualboot configuration
4. Linux - event logging and system security
5. Linux - X-Window System
6. Linux - kernel
7. Windows - remote installation
8. Windows - Active Directory
9. Windows - application programming interface (API)
10. Windows - PowerShell framework
11. Windows - RAID data storage
12. Windows - event logging

19. **Examination:** no

20. **Primary sources:**

21. Secondary sources:
5. Linux manual
8. Dokumentacja w internecie, np.: debian.org, linuxquestions.org

22. 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>30/15</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</td>
<td>10/10</td>
</tr>
<tr>
<td></td>
<td>Total number of hours:</td>
<td>70/30</td>
</tr>
</tbody>
</table>

23. Total hours: 100

24. Number of ECTS credits: 3 (1 - sem.5, 2 – sem6)

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

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

27. Comments: -

Approved:

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

1 ECTS credit – 25-30 student workload hours