1. Course title: ADVANCED COMPUTER NETWORKS

2. Course code

3. Validity of course description: from 2012/2013

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

5. Mode of studies: extramural studies

6. Field of study: COMPUTER SCIENCE (INFORMATICS) (FACULTY SYMBOL) RAU

7. Profile of studies: general academic

8. Programme:

9. Semester: 3

10. Faculty teaching the course: Institute of Computer Science

11. Course instructor: Mirosław Skrzewski

12. Course classification: common

13. Course status: compulsory

14. Language of instruction: English

15. Pre-requisite qualifications: Computer Networks, Computer Programming

16. Course objectives: The aim of the course is to present advanced topics relating to the construction and operation of computer networks, especially of the access network ("last mile solutions"), corporate networks, and the operation of Internet backbone.

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 possesses basic knowledge about the solution of the Internet access lines (&quot;last mile&quot;) in wired and wireless technologies.</td>
<td>Written exam, tests on laboratory exercises</td>
<td>Lectures, Lab exercises</td>
<td>K2A_W06, K2A_W16</td>
</tr>
<tr>
<td>2.</td>
<td>Student knows and understand the principles of operation of dedicated wide area corporate networks of frame-relay type.</td>
<td>Written exam, tests on laboratory exercises</td>
<td>Lectures, Lab exercises</td>
<td>K2A_W06, K2A_W16, K2A_U11</td>
</tr>
<tr>
<td>3.</td>
<td>Student possesses the knowledge of communications technologies of backbone networks (ATM, MPLS) of wide area network.</td>
<td>Written exam, tests on laboratory exercises</td>
<td>Lectures, Lab exercises</td>
<td>K2A_W16</td>
</tr>
<tr>
<td>4.</td>
<td>Student knows and understand the principles of route selection algorithms of wide area network protocols (IGP, EGP, AS).</td>
<td>Written exam, tests on laboratory exercises</td>
<td>Lectures, Lab exercises</td>
<td>K2A_W06, K2A_W16, K2A_U11</td>
</tr>
<tr>
<td>5.</td>
<td>Student possesses in-depth knowledge of the principles of operation and security of client-server applications, peer-to-peer resource sharing and network operating systems.</td>
<td>Written exam, tests on laboratory exercises</td>
<td>Lectures, Lab exercises</td>
<td>K2A_W16, K2A_U15, K2A_U17</td>
</tr>
<tr>
<td>6.</td>
<td>Student possesses the knowledge of the operation of snmp protocol and the methods of monitoring the performance of network communications</td>
<td>Written exam, tests on laboratory exercises</td>
<td>Lectures, Lab exercises</td>
<td>K2A_W16, K2A_U17</td>
</tr>
</tbody>
</table>

18. Teaching modes and hours

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

Lecture - 15 h, Laboratory - 15 h

19. Syllabus description:

Lecture:

Internet communication architecture, the core network, access networks. The evolution of access network solutions. Access on the telephone lines, ISDN networks, broadband ADSL, DSL. Access solutions using the cable TV network, DOCSIS specification. Radio network solutions, standards 802.11 a / b / g / n networks, LTE, network standard 802.16. Mobile systems, routing problems of mobile stations.

Corporate network technologies, the evolution of corporate solutions, X.25, Frame Relay, ISDN B-network. ATM backbone network solutions, network 1G, 10G
Ethernet, MPLS standard. Problems in the core network routing, collaboration of networks with different transmission organizations. Classification of QoS, traffic shaping algorithms, methods of prevention of overloading the network nodes.


Lab exercises:
- Basics of routing in wide area networks
- Configuration and testing of access routers
- Management of network resources, SNMP protocol
- Configuration and monitoring of the radio LAN network
- Configuration of Windows domain network environment

20. Examination: semester 3

21. Primary sources:
A. Tanenbaum, Computer Networks, Prentice Hall, 2010

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>15/45</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>/</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>15/25</td>
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<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 preparation)</td>
<td>/25</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>30/95</td>
</tr>
</tbody>
</table>

24. Total hours: 125

25. Number of ECTS credits: 5

26. Number of ECTS credits allocated for contact hours:

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

26. Comments:

Approved:

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