



**UNIVERSITY “UKSHIN HOTI” PRIZREN**  
**FACULTY OF COMPUTER SCIENCE**

PROGRAM: Information Technology and Telecommunication

<b>SYLLABUS</b>							
<i>Level of studies</i>	Bachelor	<i>Program</i>	TIT	<i>Academic year</i>	2018/2019		
<i>SUBJECT</i>	Cloud Computing						
<i>Year</i>	3 <sup>rd</sup>	<i>Status Of the subject</i>	Obligatory	<i>Code</i>		<i>ECTS credits</i>	6
<i>Semester</i>	VI						
<i>Teaching weeks</i>	15		<i>Hours teaching</i>	60	<i>Lectures</i>	<i>Exercises</i>	
		2			2		
<i>Teaching Methodology</i>	Lectures, exercises, seminar papers, consultations, etc.						
<i>Consultations</i>	1 hr / week						
<i>Professor</i>	Prof. Ass. Dr. Arsim Susuri	<i>E-mail:</i>	arsim.susuri@uni-prizren.com				
		<i>Tel.:</i>					
<i>Assistant</i>	Ass. Arbër Beshiri, PhD. C.	<i>E-mail:</i>	arber.beshiri@uni-prizren.com				
		<i>Tel.:</i>					

Study goal and table of content	Benefits of student
<p>Through this course it is possible for students to know the basic concepts, definitions, and best practices of cloud computing. Students will be introduced to the cloud computing basics and some of the approaches that apply to this field. Objectives of this course to provide a foundation on the cloud computer and program experience using virtualized resources. In particular, students will gain knowledge about:</p> <ul style="list-style-type: none"> <li>• Cloud Computing Models,</li> <li>• Infrastructure-As-a-Service (IaaS),</li> <li>• Platform-as-a-Service (PaaS) and</li> <li>• Software-as-a-Service (SaaS).</li> </ul>	<p>Upon completion of this course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Understand the foundations, evolution and concepts of cloud computing</li> <li>• Identify and describe different patterns in cloud computing, their differences.</li> <li>• Recognized with the technologies and key standards in cloud computing</li> <li>• Describe the motivation, current state and future trends in cloud computing</li> <li>• Implement and practice learning through project forms and / or case studies.</li> </ul>

<b>Methodology for the implementation of educational topics:</b>		
The course is a combination of lectures, discussions, discussions, numerical and laboratory exercises, the tasks are presented by the subject professor and assistant in the lab.		
<b>Conditions for realization of educational topics:</b>		
Adequate literature, tables, computers, projectors, Arduino boards and other IT tools for learning and exercises.		
<b>Ways of assessing the student (in %) :</b>	<b>Evaluation in%</b>	<b>Final grade</b>
Project/laboratory	20.00 %	51-60% - grade 6 61-70            7 71-80            8 81-90            9 91-100         10
Test 1	40.00 %	
Test 2	40.00 %	
Or		
<b>Total</b>	<b>100.00 %</b>	
<b>Obligations of student:</b>		

Lectures		Exercises			
The student should be regular in lectures and especially in exercises, make use of all learning opportunities, use compulsory and broader literature, be active and respect the rules on high school ethics in courtesy and cooperation.		The student should be active in the exercises and reflect the readiness and knowledge of initiatives, ideas and demonstrations of the knowledge acquired in the lectures.			
Activities	Hour/ weeks	Days/Weeks	Total		
Lectures	2	15	30		
Laboratory exercises	2	15	30		
Contacts with teachers / consultations	1	5	5		
Practical work	1	2	2		
Projects, presentations, etc.	1	2	2		
Own study time	3	15	45		
Preparation for final exam	5	6	30		
Time spent in the assessment (tests, final exam, etc.)	2	3	6		
<b>Notice: 1 ECTS credits= 25</b> hour commitment, e.g. if the subject has 6 ECTS credits student must have 150 hours during the semester commitment.		<b>Total load:</b>	<b>150</b>		
Week	Lectures	Hour	Exercises		
	Topic		Topic		
1	<ul style="list-style-type: none"> <li>• <b>Presentation of the syllabus</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Definition of cloud</li> <li>• Types of clouds</li> <li>• Cloud components</li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Working with Google Drive for creating data sheets</b></li> </ul>		2
2	<ul style="list-style-type: none"> <li>• <b>Infrastructure-as-a-Service (IaaS)</b> <ul style="list-style-type: none"> <li>• Hardware Virtualization</li> <li>• Processor</li> <li>• Memory</li> <li>• I/O</li> <li>• Network</li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Installation and configuration of JustCloud</b></li> </ul>		2
3	<ul style="list-style-type: none"> <li>• <b>Infrastructure-as-a-Service (IaaS)</b> <ul style="list-style-type: none"> <li>• Software Virtualization <ul style="list-style-type: none"> <li>▪ Hypervisors</li> <li>▪ Complete virtualization</li> <li>▪ Pre-virtualization</li> </ul> </li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Working with Cloud9 for demonstrating different programming languages</b></li> </ul>		2
4	<ul style="list-style-type: none"> <li>• <b>Infrastructure-as-a-Service (IaaS)</b> <ul style="list-style-type: none"> <li>• Software Virtualization <ul style="list-style-type: none"> <li>▪ Hypervisors</li> <li>▪ Complete virtualization</li> </ul> </li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Working with Codenvy</b></li> </ul>		2
5	<ul style="list-style-type: none"> <li>• <b>Infrastructure-as-a-Service (IaaS)</b> <ul style="list-style-type: none"> <li>• IaaS ecosystems <ul style="list-style-type: none"> <li>▪ Open source</li> <li>▪ Public clouds</li> </ul> </li> </ul> </li> <li>•</li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Installation and configuration of Hadoop/Eucalyptus</b></li> </ul>		2
6	<ul style="list-style-type: none"> <li>• <b>Infrastructure-as-a-Service (IaaS)</b> <ul style="list-style-type: none"> <li>• IaaS ecosystems <ul style="list-style-type: none"> <li>▪ Public clouds</li> </ul> </li> <li>•</li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Working and installing Google App Engine</b></li> </ul>		2
7	<ul style="list-style-type: none"> <li>• <b>Infrastructure-as-a-Service (IaaS)</b> <ul style="list-style-type: none"> <li>• Other issues with cloud <ul style="list-style-type: none"> <li>▪ Direct migration</li> </ul> </li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>• <b>Working and installing Microsoft Azure</b></li> </ul>		2

	<ul style="list-style-type: none"> <li>▪ Scaling</li> <li>▪ Availability</li> <li>▪ Management</li> <li>▪ Performance</li> <li>▪ Security</li> </ul>			
8	<b>Test 1</b>	2	<ul style="list-style-type: none"> <li>• <b>Working with Mangrasoft Aneka</b></li> </ul>	2
9	<ul style="list-style-type: none"> <li>• <b>Platform-as-a-Service (PaaS)</b> <ul style="list-style-type: none"> <li>• Requirements for PaaS</li> <li>• Reference architecture for PaaS</li> <li>• Commercial PaaS</li> <li>• Goggle File System (GFS)</li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Case study – Amazon</b></li> </ul>	2
10	<ul style="list-style-type: none"> <li>• <b>MapReduce</b> <ul style="list-style-type: none"> <li>• Challenges</li> <li>• Applications of MapReduce</li> </ul> </li> <li>• <b>Hadoop Distributed File System (HDFS)</b> <ul style="list-style-type: none"> <li>• Architecture</li> <li>• Virtual application</li> <li>• Managing virtual application</li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Case study – Google Apps</b></li> </ul>	2
11	<ul style="list-style-type: none"> <li>• <b>Software-as-a-Service (SaaS)</b> <ul style="list-style-type: none"> <li>• Features and benefits</li> <li>• High level architecture</li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Business solutions from Google for data access and data upload 1</b></li> </ul>	2
12	<ul style="list-style-type: none"> <li>• <b>Green Cloud Computing</b> <ul style="list-style-type: none"> <li>• Energy consumption in large datacenters</li> <li>• Datacenter metrcis</li> <li>• Energy efficiency for different levels of usage</li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Business solutions from Google for data access and data upload 2</b></li> </ul>	2
13	<ul style="list-style-type: none"> <li>• <b>Security in cloud computing</b> <ul style="list-style-type: none"> <li>• Loss of control in cloud computing</li> <li>• Lack of trust in the cloud</li> <li>• Taxonomy of fear</li> <li>• Model of threat</li> <li>• Types of attacks</li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Application of hypervisors as software managers through controlling panels 1</b></li> </ul>	2
14	<ul style="list-style-type: none"> <li>• <b>Privacy in cloud computing</b> <ul style="list-style-type: none"> <li>• Main fears</li> <li>• Auditing, monitoring and managing risk</li> <li>• Possible solutions <ul style="list-style-type: none"> <li>• Minimizing lack of trust</li> <li>• Monimizing loss of control</li> </ul> </li> </ul> </li> </ul>	2	<ul style="list-style-type: none"> <li>• <b>Application of hypervisors as software managers through controlling panels 2</b></li> </ul>	
15	<b>Test 2</b>	2	<ul style="list-style-type: none"> <li>• <b>Repetition of exercises</b></li> <li>• <b>Reinforcement for the test 2</b></li> </ul>	

<b>LITERATURE:</b>
<p><b>Main Literature:</b></p> <ol style="list-style-type: none"> <li>1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Cloud Computing: A Practical Approach,</li> </ol>

McGraw-Hill, 2010.

2. Dan Marinescu, Cloud Computing Theory and Practice, Elsevier, 2013.
3. Cloud Computing Lab Manual.

**Additional literature:**

1. B. Furht, A. Escalante, Handbook of Cloud Computing, Springer, 2010.
2. J. Joseph, C. Fellenstein, Grid Computing, IBM Press.

**NOTICE:**

In general, lecture presentations will be made through the PowerPoint system, the table, the use of materials and software and the Internet.

- Also additional resources (scientific papers, publications, national bulletins, and recent discoveries and research) will be provided by the professor.
- In the absence of the opportunity for practical work to be organized weekly, in cooperation with the University's management, this activity will be organized on certain days in: organizations, companies, ltd, farms, manufacturing units.
- During each session, dialogue and co-participation will be organized with the students.

**Notice for the student:**

Students are required to be regular in the lectures and exercises section.

The contribution of students in the form of conversation and cooperation with students will be evaluated. Timely arrival in lectures and exercises is mandatory.