



**UNIVERSITY OF PRIZREN**  
**FACULTY OF COMPUTER SCIENCE**

PROGRAM:

<b>Curriculum - – SYLLABUS</b>							
<i>Level of studies</i>	Master	<i>Program</i>	TIT	<i>Academic year</i>	2018/2019		
<i>SUBJECT</i>	Cloud Computing						
<i>Year</i>		<i>Status Of the subject</i> Obligatory	<i>Code</i>		<i>ECTS credits</i>		5
<i>Semester</i>					<i>Lectures</i>	<i>Exercises</i>	
<i>Teaching weeks</i>	15		<i>Hours teaching</i>	60	2	2	
<i>Teaching Methodology</i>	Lectures, exercises, consultations, tests.						
<i>Consultation</i>							
<i>The teacher</i>	Dr.sc. Arianit Maraj		<i>E-mail:</i>	<a href="mailto:Arianitm@gmail.com">Arianitm@gmail.com</a>			
			<i>Tel.:</i>	044 425 159			
<i>Assistant</i>	Msc. Arber Beshiri		<i>E-mail:</i>	<a href="mailto:Arber.beshiri@uni-prizren.com">Arber.beshiri@uni-prizren.com</a>			
			<i>Tel.:</i>	049 263 059			

<b>Study goal and table of content</b>	<b>Benefits of student</b>
<p>Through this course, the students will be able to recognize distributed systems and cloud computing, infrastructure, new architectures, interfaces and standards, models of cloud services. Also, the students should be able to use case studies, such as: organizations, businesses and different strategies of implementing cloud systems in governmental organizations.</p> <p>Students will be informed with the concepts and issues of cloud computing and service models (IaaS, PaaS, and SaaS), Service Oriented Architecture (SOA), leasing estimation, patterns of trade decisions investment strategies and sustainable development of IT; cloud computing programming and software environments, cloud applications in various industry sectors as well as open issues including security, law, ethics, and public policy.</p>	<p>After completion of this course, students will gain advanced knowledge for modern IT technologies: hardware and software as well as technology trends, computer clusters, virtualization, data centers, service oriented architectures (SOAs), distributed scalable systems and services encrypted cloud computing and business models, traffic and management, other IT technologies and new applications.</p> <p>After completing this course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Advanced knowledge with modern IT technologies: computer clusters, virtualization, data centers, service oriented architectures (SOAs), distributed scalable systems and services encrypted, cloud computing, business models, traffic and management, and new applications.</li> <li>- Have knowledge of IT project management techniques for private, public and/or hybrid projects, including IaaS (infrastructure as a service), SaaS (Software as a Service), PaaS (Platform as a Service) platform or computing and cloud-based cloud services "after-you-go".</li> <li>- Prepare reports and presentations for implementing different projects for cloud computing</li> </ul>

**Methodology for the implementation of educational topics:**

Lectures, slides, readings, and exercises. Also, the students will work on homework, group or individual projects. Cases of studies will be included according to the situation.

**Conditions for realization of educational topics:**

•

Ways of assessing the student (in %) :	Evaluation in%	Final grade
Two tests and project and/or homework.	First test 40%	91 - 100 = 10
	Second test 40%	81 - 90 = 9
	Project/homework 20%	71 - 80 = 8
	OR	61 - 70 = 7
<b>Total</b>	<b>100.00 %</b>	51 - 60 = 6

**Obligations of student:**

Lectures	Exercises

Activities	Hour/ weeks	Days/Weeks	Hours
Lectures	2	15	30
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

**Notice: 1 ECTS credits= 25** hour commitment, e.g. if the subject has 6 ECTS credits student must have 150 hours during the semester commitment. **Total load: 150**

Week	Lectures	Hour	Exercises	
	Topic		Topic	
1	Presentation of the syllabus <ul style="list-style-type: none"> <li>• Introduction</li> <li>• General aspects of computing – focusing on networking</li> </ul>	2	- Practical analysis of the cloud computing systems	2
2	Parallel and distributed systems <ul style="list-style-type: none"> <li>- Parallel computing</li> <li>- Architecture of parallel computing</li> </ul>	2	- Creating Warehouse applications with the Salesforce.com platform	2
3	Cloud Infrastructure <ul style="list-style-type: none"> <li>- Cloud computing in Amazon</li> <li>- Cloud computing in Google</li> <li>- Cloud computing in Microsoft</li> <li>- User experience</li> </ul>	2	- Implementing SOAP Web services in C#Java	2
4	Cloud computing; applications and paradigms <ul style="list-style-type: none"> <li>- Cloud computing challenges</li> <li>- Workflow: Coordination of multiple activities</li> </ul>	2	- Implementing SOAP Web services in C#Java	2
5	Cloud computing; applications and paradigms <ul style="list-style-type: none"> <li>- Programming model based on MapReduce</li> <li>- Case study: The GrepTheWeb application</li> <li>- High Performance Computing in cloud</li> </ul>	2	- Implementation of pre-virtualization through VM Ware / Oracle Virtual Box stations and Guest O.S.	2

6	Resource virtualization in Cloud - Layering and virtualization - Virtual machines - Software error isolation	2	- Implementation of pre-virtualization through VM Ware / Oracle Virtual Box stations and Guest O.S.	2
7	Resource managing and planning in the Cloud - Policies and mechanisms for resource management - Coordination of specialized and autonomous performance managers	2	- Implementation of pre-virtualization through VM Ware / Oracle Virtual Box stations and Guest O.S.	2
8	First test	2	- Recapitulation of the material covered for first test	2
9	Support for networks - Packet switching networks - Internet - Migration toward IPv6	2	- Installation and configuration of the Hadoop	2
10	Support for networks - Layered networks - Algorithms - SI, SIR and SIS Algorithms	2	- Creating an application (eg, Word Count) through Hadoop Map / Reduce	2
11	Backup systems • Evolution of backup technology - Backup templates, file systems, and databases	2	- Case study: PAAS (facebook, google, app engine)	2
12	Cloud security - Security risks in the cloud - Security: the main user's concern - Privacy - MV security issues	2	- Case study: PAAS (facebook, google, app engine)	2
13	Complex systems and self-organization • Abstraction and physical reality • Reduction of complexity • Modularity, Layering and hierarchy	2	- Case study: amazon web services	2
14	Developing applications in the cloud - Amazon web services: EC2 - Connection of clients in the cloud through firewalls - Managing SQS services in c#	2	- Case study: amazon web services	2
15	Second test	2	- Preparation for second test - Projects and/or homework	2

## LITERATURE:

### Basic literature:

1. D. Marinescu, Cloud Computing, Theory and Practice, Elsevier Inc., ISBN: 978-0-12404-627-6.
2. K. Hwang, G. C. Fox, and J. J. Dongarra, Distributed and Computing, Elsevier Inc., ISBN 978-0-12-385880-1, 2012.
3. Cloud Computing Lab Manual
4. The CloudLab Manual - <http://docs.cloudlab.us/index.html>

### Additional literature:

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

## NOTICE:

- Generally, the lecture presentations will be made through the PowerPoint
- Additional resources (scientific papers, publications, national bulletins, and recent discoveries and research) will be provided by the professor.

- 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.