

APPROVED BY

Director of *Institute of Cybernetics*

 / *Dmitriy M. Sonkin*

Distributed systems and cloud computing

Field of Study: 09.03.04 Software Engineering

Programme name: Big Data Solutions

Level of Study: Master Degree Programme

Year of admission: 2019

Semester, year: 3, 2

ECTS: 6

Total Hours: 216

Contact Hours: 48

- **Lectures:** 24
- **Labs:** 24
- **Practical experience:**

Assessment: exam

Department: Software Engineering

Head of Department



V.S. Sherstnev

Instructor(s)



S.V. Axyonov

Distributed systems and cloud computing

Course Overview

Course Objectives	Course is aimed to formation of student's skills and abilities for professional cloud computing and development of distributed processing software.
Learning Outcomes	<p>As a result of mastering the discipline, the student must achieve the following results:</p> <ul style="list-style-type: none"> - Ability to use cloud IaaS, PaaS and SaaS services. - Ability to design web-applications and services based on PaaS. - Ability to manage virtual machines. - Understanding the basics of the following technologies: Infrastructure as a Service, Platform as a Service, Software as a Service.
Course Outline	<ol style="list-style-type: none"> 1. <i>Basics of cloud technologies,</i> 2. <i>Paradigm of cloud computing technologies</i> 3. <i>Management of virtual machines</i> 4. <i>Security of cloud services</i> 5. <i>High-performance computing in cloud</i> 6. <i>PaaS</i> 7. <i>SaaS</i> 8. <i>Legal aspects, management and case-study</i>
Prerequisites (if available)	<i>Software Engineering, Networking</i>
Course Structure	<ol style="list-style-type: none"> 1. <i>Basics of cloud technologies</i> <i>Basic terms and definitions.</i> 2. <i>Paradigm of cloud computing technologies</i> 3. <i>Management of virtual machines</i> 4. <i>Security of cloud services</i> 5. <i>High-performance computing in cloud</i> 6. <i>PaaS</i> 7. <i>SaaS</i> 8. <i>Legal aspects, management and case-study</i>
Facilities and Equipment	<i>Computer lab equipped by the following software: Microsoft Azure Machine Learning Workbench, Microsoft Visual Studio, Eclipse, R and Python compilers. Hardware supports CPU multithreading and GPU processing</i>
Grading Policy	<p><i>Current assessment which is performed on a regular basis during the semester by scoring the quality of mastering of theoretical material and the results of practical activities (performance tests, perform tasks, problem solving). Max score for current assessment is 60 points, min – 40 points.</i></p> <p><i>Course final assessment (exam/ credit test) is performed at the end of the semester. Max score for course final assessment is 40 points, min – 22 points.</i></p> <p><i>The final rating is determined by summing the points of the current assessment during the semester and exam (credit test) scores at the end of the semester. Maximum overall rating corresponds to 100 points, min pass score is 80.</i></p>
Course Policy	<i>Class attendance will be taken into consideration when evaluating students' participation in the course / Students are expected to actively engage in class</i>

	<i>discussions about the assigned readings. / Attendance is strictly controlled. All classes is obligatory to presence.</i>
Teaching Aids and Resources	<p><i>Compulsory Readings:</i></p> <ol style="list-style-type: none"> 1. Haishi Bai Zen of Cloud. Learning Cloud Computing by Examples on Microsoft Azure. CRC Press. Taylor & Francis Group, 2015. - 490 pages. - ISBN 978-1-4822-1581-6 2. K.Chandrasekaran Essential of Cloud Computing. CRC Press. Taylor & Francis Group, 2015. - 370 pages. – ISBN 978-1-4822-0544-2 3. Michael Washam, Rick Rainey Exam Ref70-533 Implementing Microsoft Azure Infrastructure Solutions. Microsoft Press, 2015. – 400 pages. - ISBN: 978-0-7356-9706-5 4. Sandeep Bhowmik Cloud Computing. Cambridge University Press, 2017. – 430 pages. - ISBN 978-1-316-63810-1 5. Intelligent Information Systems. Vol.4. Adaptive Cloud Enterprise Architecture. Ed.: Asif Qumer Gill, World Scientific Publishing Co., 2015. – 240 pages. - ISBN 978-981-4632-12-6 <p><i>Additional Readings:</i></p> <ol style="list-style-type: none"> 1. Ivan Mistrik Managing Trade-Off in Adaptive Software Architecture. Morgan Kauffman. – 2017. – 430 pages. – ISBN 978-0-1280-2855-1 2. Abhishek Mishra Amazon Web Services for Mobile Developers. Sybex – 2017. – 792 pages. – ISBN 978-1-1193-7785-6 3. Mohsin Shafique Hijazee Mastering Google App Engine. Packt Publishing 2015. – 297 pages. - ISBN 978-1-784-39667-1 4. Shijimol Ambi Karthikeyan Azure Automation Using the ARM Model: An In-Depth Guide to Automation with Azure Resource Manager Apress. – 2017. – 174 pages. – ISBN 978-1-4842-3219-4 5. Yatish Patil Azure IoT Development Cookbook Packt Publishing. – 2017. - 254 pages. – ISBN 978-1-7872-8300-8 6. Data Security in Cloud Computing. Ed.: Vimal Kumar, Sivadon Chaisiri, Ryan Ko. The Institution of Engineering and Technology 2017 – 328 pages. – ISBN 978-1-78561-220-6 7. Justin Garrison, Kris Nova Cloud Native Infrastructure: Patterns for Scalable Infrastructure and Applications in a Dynamic Environment O'Reilly Media 2017 – 160 pages. – ISBN 978-1-4919-8430-7 <p><i>Internet resources:</i></p> <ol style="list-style-type: none"> 1. Microsoft Azure Portal– http://azure.microsoft.com/azure-cloud 2. Elastic Compute Cloud (EC2). – http://aws.amazon.com 3. Google App Engine Official Web-portal http://appengine.google.com 4. IBM developer community http://www.ibm.com/developerworks/ru
Instructor (-s)	<i>Axyonov Sergey Vladimirovich, PhD, Assistant professor, E-mail: axyonov@tpu.ru, Skype: axoenow.sergej, Mob. +79138874790</i>