COURSE OUTLINE

1. GENERAL

SCHOOL	School of Sciences		
DEPARTMENT	Computer Science		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**616 SKCE**	**SEMESTER**	**6**
COURSE TITLE	CLOUD AND GRID COMPUTING ARCHITECTURE		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	2	
Exercises	1	
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		5

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	Scientific Area, Skill Development
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	GREEK
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

This specific course aims both at understanding the theoretical background of cloud computing and at familiarizing students with cloud computing and grid technologies. their creation. Clouds (IaaS/, PasS, StaaS, HaaS DaaS) such as Xen, VMware and KVM virtualization and GRIDs (eg computing, data, etc.) are explained. Introduction to Micro-Services with Docker and application orchestration with Kubernetes.

IaaS/PaaS/SaaS Issues concerning the development of dynamic computing/storage systems in relation to elasticity and the provision of computing resources are considered. IaaS

Indicative Platforms to study, AWS, Eucalyptus, OpenStack, Google App Engine and superior data storage arrangements such as S3, Dynamo and Google Storage,

The introduction and familiarization with the environment of ESET's Oceanos

Upon completion of the module the student will be able to

- recognize the basic models of cloud and grid applications.
- Identify cloud development models (private, community, public, etc.)
- • distinguish advantages and disadvantages of cloud and grid infrastructures
- • distinguish, phases of execution of tasks and services
- • calculate and evaluates the performance of programs in Cloud Computing environments

- • design open service architectures
- • run programs in Cloud/Grid environments
- • develop applications in Cloud Computing environments.
- • orchestrate applications with Kubernetes.
- • run simple /parallel MPI tasks and perform program performance measurements in the Oceanos environment

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,
ICT Use
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and sensitivity to gender issues
Critical thinking
Promoting free, creative and inductive reasoning

- Individual work
- Teamwork
- Search, analysis and synthesis of data and information, using the necessary technologies

3. COURSE CONTENT

1. Cloud Computing:
2. Platform as a Service level and Software as a Service level:
3. Infrastructure as a Service level: Cloud storage technologies
4. Future internet infrastructures
5. Big Data Applications
6. Network Architectures
7. Grid Applications.
8. Kubernetes
9. Transcendent Provisions for Data Storage

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	In the classroom and in the laboratory Specialized Software
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	LMS such as Moodle online platform
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.*	

Activity	*Workload/semester*
Lecture	40
Practical exercises focusing on the application of methodologies and analysis of case studies in smaller groups of students	10
Teamwork in a case study.	20

The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.	computer science course analysis and design	
	Independent Study	25
	Total Course (25h workload /ECTS)	***100***

STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others* *Please indicate all relevant information about the course assessment and how students are informed*	Final written exam (50%) II. Presentation of individual work (20%) III. Group Work Presentation (30%)

5. SUGGESTED BIBLIOGRAPHY

1. Douglas Comer (2021), The Cloud Computing Book, The Future of Computing Explained, 1st Edition, Published by Chapman & Hall ISBN 9780367706845 July 24, 2023
2. Josh Rosso, Rich Lander et all (2021), Production Kubernetes: Building Successful Application Platforms, ISBN-13: 978-9391043049, May 22, 2021
3. Poulton Nigel (2023) The Kubernetes Book: 2024 Edition ISBN-13978-1916585003, June 20, 2023
4. Poulton, Nigel (2019). Docker deep dive. JJNP Consulting Limited, 2019.
5. Rafaels, Ray J (2015). Cloud Computing: From Beginning to End. CreateSpace Independent Publishing Platform, 2015.
6. Ruparelia, Nayan B (2016). Cloud computing. MIT Press, 2016. (ISBN: 978-0262529099)

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	
Contact details:	
Supervisors: (1)	
Evaluation methods: (2)	
Implementation Instructions: (3)	

(1) Please write YES or NO

(2) Note down the evaluation methods used by the teacher, e.g.

- *written assignment* or/and exercises
- written or oral examination with distance learning methods, provided that the integrity and reliability of the examination are ensured.

(3) In the **Implementation Instructions** section, the teacher notes down clear instructions to the students:

a) in case of **written assignment and / or exercises:** the deadline (e.g. the last week of the semester), the means of submission, the grading system, the grade percentage of the assignment in the final grade and any other necessary information.

b) in case of **oral examination with distance learning methods:** the instructions for conducting the examination (e.g. in groups of X people), the way of administration of the questions to be answered, the distance learning platforms to be used, the technical means for the implementation of the examination (microphone, camera, word processor, internet connection, communication platform), the hyperlinks for the examination, the duration of the exam, the grading system, the percentage of the oral exam in the final grade, the ways in which the inviolability and reliability of the exam are ensured and any other necessary information.

c) in case of **written examination with distance learning methods**: the way of administration of the questions to be answered, the way of submitting the answers, the duration of the exam, the grading system, the percentage of the written exam of the exam in the final grade, the ways in which the integrity and reliability of the exam are ensured and any other necessary information.

There should be an attached list with the Student Registration Numbers only of students eligible to participate in the examination.