

Course Name : Distributed Systems and Cloud Computing

Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
CMP 408	B	Spring	3.00	1.00	0.00	3.50	6.00

Lecturer	Enida Sheme, PhD
Assistant	Klevis Topi, Msc
Course language	Albanian
Course level	Master
Description	This course provides an in-depth understanding of distributed systems concepts and cloud computing technologies. It covers distributed architectures, inter-process communication, fault tolerance, and the major cloud platforms and services, including IaaS, PaaS, and SaaS models.
Objectives	To understand the core principles of distributed systems and cloud computing. To analyze technical and security challenges in distributed environments. To apply concepts of virtualization and service orchestration in the cloud. To implement cloud technologies in real-world industry scenarios.
Core Concepts	Inter-process communication and synchronization Consistency and fault tolerance Virtualization and resource management IaaS, PaaS, SaaS models Cloud services and orchestration

Course Outline

Week	Topic
1	Introduction to Distributed Systems and Cloud Computing
2	Distributed System Architectures
3	Inter-Process Communication and Protocols
4	Synchronization and Consistency in Distributed Systems
5	Fault Tolerance and Failure Detection
6	Virtualization: Concepts and Technologies
7	Cloud Computing Models: IaaS, PaaS, SaaS
8	Midterm Exam
9	Security in Distributed and Cloud Systems
10	Resource Management and Service Orchestration
11	Popular Cloud Services (AWS, Azure, GCP)
12	Containerization and Orchestration with Docker/K8s
13	Metrics and Monitoring in Cloud Systems
14	Case Studies of Cloud Applications
15	Project Presentations / Final Review
16	Final Exam

Prerequisites	The student must attend the course at a minimum rate of 75%.			
Literature	<ul style="list-style-type: none"> • Andrew S. Tanenbaum, Maarten van Steen – Distributed Systems: Principles and Paradigms, 2nd Edition, Pearson, 2007. 			
References	<ul style="list-style-type: none"> • Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi – Mastering Cloud Computing: Foundations and Applications Programming, Morgan Kaufmann, 2013. • George Coulouris et al. – Distributed Systems: Concepts and Design, 5th Edition, Addison-Wesley, 2011. • Thomas Erl – Cloud Computing: Concepts, Technology & Architecture, Prentice Hall, 2013. 			
Course Outcome				
1	Students will understand how distributed systems work and the challenges they present.			
2	They will be able to analyze and apply virtualization and orchestration techniques.			
3	They will understand major cloud services and how they interact.			
4	They will apply knowledge in designing and implementing cloud-based solutions.			
Course Evaluation				
	In-term Studies	Quantity	Percentage	
	Midterms	1	20	
	Quizzes	1	5	
	Projects	1	10	
	Term Projects	0	0	
	Laboratory	0	0	
	Class Participation	1	5	
	Total in-term evaluation percent		40	
	Final exam percent		60	
	Total		100	
ECTS Workload (Based on Student Workload)				
	Activities	Quantity	Duration (hours)	Total (hours)
	Course duration (Including the exam week: 16x Total hours of the course)	16	4	64
	Study hours outside the classroom (Preparation, Practice, etc.)	14	5	70
	Duties	1	4	4
	Midterms	1	3	3
	Final Exam	1	3	3
	Other	0	2	0
	Total Work Load			144
	Total Work Load / 25 (hours)			5.76
	ECTS			6.00