San Cristobal of Huamanga National University (UNSCH)
School of Computer Science
Syllabus 2024-II

1. COURSE

CS3P2. Cloud Computing (Mandatory)

2. GENERAL INFORMATION

2.1 Course	:	CS3P2. Cloud Computing
2.2 Semester	:	10^{th} Semester.
2.3 Credits	:	3
2.4 Horas	:	1 HT; 4 HP;
2.5 Duration of the period	:	16 weeks
2.6 Type of course	:	Mandatory
2.7 Learning modality	:	Face to face
2.8 Prerrequisites	:	CS370. Big Data. (9^{th} Sem) CS370. Big Data. (9^{th} Sem)

3. PROFESSORS

Meetings after coordination with the professor

4. INTRODUCTION TO THE COURSE

To understand advanced computational techniques, students must have a strong knowledge of various discrete structures, structures that will be implemented and used in the laboratory with the programming language.

5. GOALS

- Students will be able to model computer science problems using graphs and trees related to data structures.
- Students will efficiently apply traversal strategies to search for data optimally.

6. COMPETENCES

1) Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions. (Usage)

6) Apply computer science theory and software development fundamentals to produce computing-based solutions. (Usage)

7. TOPICS

Unit 1: Theoretical Foundations of Cloud Computing (12)	
Competences Expected: 1,6	
Topics	**Learning Outcomes**
• Introduction to Cloud Computing • Cloud Computing Service Models • Cloud Computing Deployment Models • Infrastructure and Data Centers • Research Trends in Cloud Computing	• Understand the concepts related to Cloud Computing. • Understand the infrastructure and components of a Data Center. • Understand service models and deployment types in Cloud Computing. • Be familiar with research trends in the area of Cloud Computing.
Readings : [**aboveTheCloud**], [**surveySecurity**], [**mobileCloud**]	

Unit 2: Data Processing (15)	
Competences Expected: 1,6	
Topics	**Learning Outcomes**
• Introduction to the Hadoop framework. • Hadoop Distributed File System. • Introduction to the MapReduce programming model. • Introduction to the Spark framework.	• Understand the concepts related to the Hadoop framework. • Understand the concepts related to the Hadoop Distributed File System. • Understand and apply the MapReduce programming model. • Understand the concepts related to the Spark framework.
Readings : [**mapreduce**], [**spark**], [**yarn**]	

Unit 3: Virtualization, Containerization (15)	
Competences Expected: 1,6	
Topics	**Learning Outcomes**
• Introduction to Containerization. • Evolution of Containerization. • Differences between Containerization and Virtualization.	• Understand the concept of Containerization. • Create and use containers. • Understand the differences between Containerization and Virtualization.
Readings : [**CborgOmegaKubernetes**], [**borg**], [**ContainerizationPaaSCloud**], [**VirtualizationContainerization**]	

Unit 4: Trends in Cloud Computing (12)	
Competences Expected: 1,6	
Topics	**Learning Outcomes**
• Autoscaling. • Infrastructure as Code. • Serverless Computing.	• Understand different forms of autoscaling. • Use different tools for Infrastructure as Code in the cloud. • Understand the Serverless Computing paradigm.
Readings : [**Cormen2009**], [**Preparata**], [**Berg**]	

Unit 5: Distributed Systems (15)	
Competences Expected:	
Topics	**Learning Outcomes**
• Distributed System Faults • Distributed Algorithms • Distributed System Architectures • Distributed Services • Core Distributed System Concepts	• Distinguish between different types of distributed system faults [Familiarizarse] • Explain the challenges of distributed systems [Familiarizarse] • Write distributed algorithms [Usar] • Measure the performance of distributed systems [Usar] • Explain the rationale behind different distributed system designs [Familiarizarse] • Implement a distributed system [Usar] • Explain the trade-offs in distributed system design [Familiarizarse] • Describe different distributed system architectures [Familiarizarse] • Give examples of distributed systems [Usar]
Readings : [Cou+11]	

8. WORKPLAN

8.1 Methodology

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

8.2 Theory Sessions

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

8.3 Practical Sessions

The practical sessions are held in class where a series of exercises and/or practical concepts are developed through problem solving, problem solving, specific exercises and/or in application contexts.

9. EVALUATION SYSTEM

********* EVALUATION MISSING ********

10. BASIC BIBLIOGRAPHY

[Cou+11] George Coulouris et al. *Distributed Systems: Concepts and Design*. 5th. USA: Addison-Wesley Publishing Company, 2011.