

CIIC 5130 Cloud Computing

1. General Information:

Alpha-numeric codification: CIIC 5130
Course Title: Cloud Computing Infrastructures
Number of credits: 3
Contact Period: 3 hours of lecture per week

2. Course Description:

English: Description of the principles of cloud computing. Discussion of the virtualization, load balancing in the system, scalability and elasticity, replication and deployment. Design and programming of applications in the cloud. Discussion of advanced aspects of cloud computing including security and software performance evaluation. Discussion of the use of cloud infrastructure for areas such as health, transportation, energy and education.

Spanish: Descripción de los principios de computación en la nube. Discusión de virtualización, equilibrio de carga en el sistema, escalabilidad y elasticidad, replicación y despliegue. Diseño y programación de aplicaciones en la nube. Discusión de aspectos avanzados de computación en la nube incluyendo seguridad y evaluación del rendimiento del software. Discusión del uso de infraestructura de nube para áreas como salud, transportación, energía y educación.

3. Pre/Co-requisites and other requirements:

Prerequisites: ((CIIC 4060 or ICOM 5016) (Database Systems) and (CIIC 4070 or ICOM 5026) (Computer Networks)) or authorization of department chair

4. Course Objectives:

This course is aimed to expose the student to the modern concept of cloud computing and to contribute to new skills relevant to this computing paradigm.

5. Instructional Strategies:

conference discussion computation laboratory
seminar with formal presentation seminar without formal presentation workshop
art workshop practice trip thesis special problems tutoring
research other, please specify:

6. Minimum or Required Resources Available:

Students will use the Departmental computer laboratories to complete course projects.

7. Course time frame and thematic outline

Outline	Contact Hours
Introduction: Introduction to cloud computing infrastructure. Characteristics of Cloud Systems. Cloud Models and Services. Cloud-based Applications	3
Cloud Foundations: Use of virtualization to provide flexible cloud management, distributed system basics, resource management.	3
Google FS and the MapReduce Model: Study of the Google distributed filesystem and the MapReduce paradigm. Study open source implementations such as Hadoop and HDFS. Understanding of the PIG and PIGLATIN framework.	6
Cloud Services and Platforms: Compute Services, Storage Services, Database Services and Analytics Services.	9
Open Source Private Cloud: Open source software infrastructure models.	3
Cloud Environment Setup: Open source setup installation and configuration of cloud systems.	3
Python for Cloud: Using Python in Cloud Environments. Cloud Application Development using Python.	6
Cloud Application Benchmarking and Tuning: Trace Generation, workload modeling and characterization. Benchmarking Tools, Load Tests.	3
Cloud Security: Cloud Security Architecture, Securing Data Models. Identity and Access Management.	3
Cloud Applications in Industry, Healthcare and Education: Discussion on the use of Cloud Systems in Healthcare, Energy Systems, Transportation Systems, Manufacturing Industry and Education.	3
Exams	3
Total hours: (equivalent to contact period)	45

8. Grading System

Quantifiable (letters) Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	2	40%
<input checked="" type="checkbox"/> Final Exam	1	25%

<input checked="" type="checkbox"/> Short Quizzes	variable	15%
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects	variable	20%
<input type="checkbox"/> Journals		
<input type="checkbox"/> Other, specify:		
TOTAL:		100%

10. Bibliography:**Textbook:**

Arshdeep Bahga and Vijay Madisetti, *Cloud Computing: A Hands-On Approach*, 1st Ed., CreateSpace Independent Publishing Platform, 2014.

References:

- Thomas Earl, Ricardo Puttini, and Zaigham Mahmood, *Cloud Computing: Concepts, Technology & Architecture*, 1st Ed., Prentice Hall, 2013.
- John Rhoton, *Cloud Computing Explained*, 2nd Ed., Recursive Press, 2013.
- <https://www.computer.org/web/tcc>, *IEEE Transactions on Cloud Computing*, IEEE Computer Society, Institute of Electrical and Electronics Engineers Digital Library.

11. Course Outcomes

After successfully completing the course, the student will be able to:	Program Student Outcomes Impacted
1. identify the basics of the foundations of cloud computing (distributed systems) and recognize the main challenges involved in such systems	2
2. explain and apply the cloud computing paradigm	2
3. apply cloud computing services for the deployment of cloud applications.	6
4. use cloud-based platforms.	1
5. design, develop and deploy cloud-based solutions	2

12. According to Law 51

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Office #4) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

13. Academic Integrity

-The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Students General Bylaws (Board of Trustees Certification 13, 2009-2010) states that academic dishonesty includes, but is not limited to: fraudulent actions; obtaining grades or academic degrees by false or fraudulent simulations; copying the whole or part of the academic work of another person; plagiarizing totally or partially the work of another person; copying all or part of another person answers to the questions of an oral or written exam by taking or getting someone else to take the exam on his/her behalf; as well as enabling and facilitating another person to perform the aforementioned behavior. Any of these behaviors will be subject to disciplinary action in accordance with the disciplinary procedure laid down in the UPR Students General Bylaws.—