Technological fundamentals in the Big Data world

Academic Year: (2020 / 2021) **Review date: 09/09/2020 13:18:48**

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: CARRETERO PEREZ, JESUS

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

OBJECTIVES

Basic Skills
Knowledge and understanding that provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context
Students must possess the learning skills that enable them to continue studying in a way that will be largely self-directed or autonomous.

General Competencies
Apply the fundamentals of software and hardware to meet the necessary technologies for the collection, storage, processing and reporting, especially for large volumes of data as a basis for the development and adaptation of such techniques to specific problems

Specific Skills

Apply knowledge of programming which to base the teaching of advanced technologies and methods for treating large volumes of data.
Know the main technologies used to build big data systems, and the main characteristics of them.
Use the basic results of work stoppage and distribution of advanced methods as a basis for prediction and classification

Learning Results
-Use Of programming techniques in the design and analysis of data processing methods
- Ability to apply advanced technology to data processing
- Knowledge and use of basic concepts of parallel and distributed programming, algorithm design and storage systems for the development of data processing applications

DESCRIPTION OF CONTENTS: PROGRAMME

1 Introduction
2 Computing platforms for Big Data
* Computing architectures
* Parallel computing
* Advanced computing platforms
* Big Data frameworks
3 Distributed Memory Systems:
* Clusters
* Clouds
* Data centers
4 Storage systems for big data
* Distributed file systems
* Parallel file systems
* Storage technologies
5 Virtualization techniques
* Virtualization fundamentals
* Virtualization techniques

* Server consolidation techniques

6 Parallel and distributed computing paradigms
* Open MP
* Web services

7 Fault-tolerance and resilience
* Fault tolerance techniques
* Fault tolerance in Big Data frameworks

8 Use cases:
* Data analytics
* Data streaming

LEARNING ACTIVITIES AND METHODOLOGY

Learning activities:
* Lectures
* Hands-on land lab projects
* Personal student work.

Teaching methodology:

* Presential lectures imparted in the class, using multimedia and informatics support, to develop the main concepts of the course. Reading materials will be provided to complement students knowledge.

* Reading of recommended texts, from papers, technical journals, manuals and reports, to extend the student knowledge of the subject topics.

* Solving practical jobs, problems, etc. proposed in class (individually or in groups).

ASSESSMENT SYSTEM

% end-of-term-examination/test:	30
% of continuous assessment (assigments, laboratory, practicals…):	70

1.- Continuous evaluation (70%)

* Class activities
* Individual or collective projects made along the course

2.- Final exam (30%)

* Solving theoretical and practical questions related to the subject.
* Minimum score 3 over 10 to make average with continuous evaluation.

BASIC BIBLIOGRAPHY

- Kai Wan and Min Chen Big-Data Analytics for Cloud, IoT and Cognitive Computing, Wiley, ISBN-13: 978-1119247029

- Vivek Kale Parallel Computing Architectures and APIs: IoT Big Data Stream Processing 1st Edición, Amazon, Edición Kindle, 2019