![UAB Universitat Autònoma de Barcelona]

2018/2019

Software Architecture and Technologies

Code: 102790
ECTS Credits: 6

Degree	Type	Year	Semester
2502441 Computer Engineering	OB	3	2
2502441 Computer Engineering	OT	4	2

Contact

Name: Lluís Gesa Bote

Email: Lluis.Gesa@uab.cat

Teachers

Helena Bolta Torrell

Ignacio Jesus Porta Lorenzo

Use of languages

Principal working language: catalan (cat)

Some groups entirely in English: No

Some groups entirely in Catalan: Yes

Some groups entirely in Spanish: No

Prerequisites

There are no official prerequisites, but it is advisable that the student has completed the subject "Enginyeria del Software" from second year and "Gestió i administració de base de Dades" from third year.
While the vehicular language is Catalan, part of complementary notes and documentation are in English, so it is need a minimum knowledge of this language.

Objectives and Contextualisation

This subject is divided into separate parts. Each part with an specific, actually and advanced topic of concepts about engineering software. The aim is to introduce the students to these topics for three or four weeks, giving him a basic knowledge in order to then be able to depeen by himself. The selected topics revolve around databases, programming, software architectures, modeling and software development. Each year three or four topics are selected.

Content

The subject consists of 3 different topics but related to the new and moder software engineering environments. The contents are ambitious, however, as the dynamics of the course aims to be very interactive, the contents could be tailored (lengthen or shorten), depending on the course of the sessions.

Topic 1. Introduction to Big-Data

The concept of BigData is the name given to sets of data, procedures and applications which, by its volume, its diverse nature and the speed at which they are to be processed exceed capacity on common computer systems. This data processing is used to detect patterns within them, may well make valid predictions for decision making. This new world of data processing needs new paradigms and strategies of software.

Contents:

- Basic concepts.
- Structures and plataforms
    - Hadoop, Spark
- BigData's software engineering
    - Algorithms and patters
    - Models and Data structures
    - Security, robustness and Integrity
- Introduction to IoT in the BigData
- Data mining / Machine Learning / Deep Learning / Predictive analytics
    - Data Scientists

Topic 2. Introduction to the Non Relational Data Bases(NoSQL) and its implementation in MongoDB.

The databases non relational (NoSQL) are the new perspective in the databases. With the exponential growth of the Internet, the volume of data stored has also grown exponentially. These data should be saved, and in certain cases, the relational databases are not the optimal response time. NoSQL databases fits to these cases.
MongoDB is one of these NoSQLdatabase, which is ideal for storing large volumes of data, metadata documents and unstructured information.

Contents:

- Introduction to the No-SQL databses: defintion, characteristics and types
- MongoDB:
    - Basic concepts
    - Characteristics
    - Introduction to JSON inside MongoDB
    - Operations: insert, import, export, find, updates, deletes, aggregations
    - Implementation in java
- NoSQL alternatives:
    - Cassandra
    - BigTable
    - AllegroGraph

Topic 3. Introduction to DevOps

DevOps (**dev**elopment and **op**eration**s)** is a culture, movement or practice that emphasizes the collaboration and communication of both software developers and other Information-Technology (IT) professionals while automating the process of software delivery and infrastructure changes. It aims at establishing a culture and environment where building, tetsing and releasing software, can happen rapidly, frequently, and more reliably.

Contents:

- Introduction to DevOps
    - Basic concepts
    - Characteristics
    - DevOps inside the Agile metodologies
- Structures and platforms
- Infrastructures management
- Acceptance tests
- Puppet, docker, vagrant technologies.