Software Architecture and Technologies 2016/2017

Code: 102790
ECTS Credits: 6

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

Contact

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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

Teachers

Helena Bolta Torrell

Rodolfo Alberto Guichon Aguilar

Ignacio Jesus Porta Lorenzo

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 four 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.

- **Topic 4. Advanced software architectures: Service oriented architecture (SOA).**

The Service Oriented Architecture is a concept of software architecture that defines the use of services to support business requirements.
Allows creation of highly scalable systems that reflect the organization's business, in another side provides a standard form of presentation and invocation of services (commonly but not exclusively web services), which facilitates the interaction between different systems themselves or third parties.
Contents:

- Introduction to SOA
    Basic concepts
    Standards: XML, HTTP ,SOAP, WSDL, UDDI

- Big Web Services vs Rest Web Services

- Scalable services
    What they are
    Desing and implementation