

Academic Year: ( 2020 / 2021 )

Review date: 12-02-2021

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: ZARRAONANDIA AYO, TELMO AGUSTIN

Type: ECTS Credits : 6.0

Year : 4 Semester :

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

- Programación / Programming
- Programación Orientada a Objetos / Object Oriented Programming (Java)

**OBJECTIVES**

Transversal competences

- Synthesis and analysis (PO a)
- Planning and organizing (PO a)
- Problem solving (PO b)
- Team working (PO d)
- Capacity to apply theoretical concepts (PO c)
- The ability to apply theoretical and practical methods to the analysis, design and development of solutions, which comply the rules of accessibility, ergonomic and security at work of the correspondent legislation (CG1)

Specific competences

- Cognitive (PO a)

1. Architecture and design patterns as they apply to the design of distributed web applications

- Procedimental/Instrumental (PO a, g, k)

1. Analysis, design and implementation of a distributed web application
2. Apply architectures and design patterns to distributed web application
3. Work in group for designing Web architectures

- Attitudinal (PO c, d, f)

1. Creativity
2. Concern about quality
3. Motivation
4. Interest for investigating and finding solutions to new problems considering their design, appeal and cost.

- Specific of Computer Science and Engineering

1. To understand the importance that negotiation, effective work practices, leadership and communication skills have in a software development environment (CER13)

- Specific of Information Systems

- 1.- To understand and apply the principles and techniques of quality management and technology innovation in an organization. (CESI6)

- Specific of Computational Engineering

- 1.- The ability to design and develop systems and communication software. (CEIC4)
- 2.- The ability to analyse, evaluate and select the most suitable hardware and software platforms for embedded systems and real time applications. (CEIC5)
- 3.- The ability to design, deploy, administer and manage computer networks. (CEIC8)

Learning results:

- Engineering Projects  
RA3.2. To understand different methods and to be able to apply them (CEIC4, CEIC5, CEIC8)
- Engineering Practice  
RA5.4: To be aware of the implications of the engineering practice (CG1)  
RA5.1: The ability to select and use the most suitable teams, tools and methods (CECRI13, CEIC8)
- Competencias Transversales  
RA6.1: The ability to work effectively both individually and as member of a team (CECRI13)  
RA6.2: The ability to use different methods to communicate effectively with the community of engineers and, in general, with the society (CECRI13)  
RA6.4: To be able to be aware of the business and project management practices, as well as of the risk management and control practices, and to understand their limitations. (CESI6)

## DESCRIPTION OF CONTENTS: PROGRAMME

Development of distributed components, Web programming, Web design patterns, Techniques for implementing asynchronous communication between servers, MVC architectures (Model View-Controller), Persistence engines

The course is divided in three blocks:

- A general overview of the JEE specification, including the most popular APIs related with this technology ( JSP, Servlet, Filtros, EJBs, JMS, JAX-RS..) and the basic concepts of designing JEE applications.
- Persistence layers using relational databases and non-relational databases
- Microservices, API Management and quality control

### PROGRAMME:

#### MODULE 1 - APIS JEE

1. Introduction. Overview of JEE
2. JEE APIs:
  - 2.1 Java Server Pages (JSP)
  - 2.2 Servlets & Filtros
  - 2.3 Enterprise Java Beans (EJBs),
  - 2.4 Application integration:
    - 2.4.1 Java Messaging Service (JMS)
    - 2.4.2 Java API para RESTful Web Services (JAX-RS)

#### MODULE 2 - DESIGNING JEE APPLICATIONS

1. The Model View Controller (MVC) Pattern
2. Core JEE Patterns

#### MODULE 3 - DATA MANAGEMENT:

1. Relational DB:
  - 1.1 Java Data Base Connectivity (JDBC)
  - 1.2 Java Persistence API (JPA)
2. NOSQL

#### MODULE 4 - MICROSERVICES

1. Introduction. General Overview
2. Spring Boot

#### MODULE 5 - API Manager & QA (Quality Assurance)

1. API Manager Concept and mission
2. API Manager Open Source
3. Continuous Integration and Continuous Delivery
4. Orchestrated QA

## LEARNING ACTIVITIES AND METHODOLOGY

Theoretical lectures: 1.5 ECTS. To achieve the specific cognitive competences of the course (PO a)

Practical lectures: 1 ECTS. To develop the specific instrumental competences and most of the general competences, such as team working, capacity to apply theoretical concepts, synthesis and analysis, and planning and organizing. Besides, to develop the specific attitudinal competences. During the practical lectures students work in groups designing and developing a web application. (PO a, c, d, g).

Guided academic activities

- Present teacher:

\* 1 ECTS. The student proposes a project according to the teachers guidance to go deeply into some aspect of the course, followed by public presentation (PO a, c, d, g, k).

\* 1 ECTS. Guided project: Students carry out a project working in group and according to teachers¿ guidelines. 1.0 ECTS (PO a, d, g)

- Absent teacher: 1 ECTS. Exercises and complementary readings. (PO a, c, g, k).

Exercises and examination: 0,5 ECTS. To complete the development of specific cognitive and procedimental capacities (PO a, c).

## ASSESSMENT SYSTEM

The final mark will be computed as the sum of the theoretical and practical evaluations following the next scheme:

Exercises and examination

At the end of term there will be an exam including questions about theory as well as guided academic activities (PO a, c).

To pass the course a minimum score in the exam will be required.

Practical case

Students will work in groups of 4 students at the most implementing a programming project. Each of the group members will play one or more roles of a development team. The group will be required to complete and defend several deliveries of the project. On a scheduled date the teacher will review each delivery in the presence of the members of the group who will be required to answer and explain how they did the practice (PO a, c, d, g, k).

Weights:

- Exercises and examination: 40%

- Practical case: 60%

<b>% end-of-term-examination:</b>	40
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	60

## BASIC BIBLIOGRAPHY

- Allamaraju, Subrahmanyam Programación Java Server con J2EE Edición1.3, Anaya.
- Allamaraju, Subrahmanyam Programación Java Server con J2EE Edición1.3, Anaya.
- Brett McLaughlin Java and XML, O`Reilly UK.
- Bruce W. Perry Java Servlet & JSP Cookbook, O`Reilly UK.
- Budi Kurniawan Java Web Developments with Servlets, JSP and EJB, Sams.
- Elizabeth Castro XML for the World Wide Web, Peachpit Press.
- Hugh E. Williams, David Lane Web Database Applications with PHP and MySQL, O`Reilly UK.

## ADDITIONAL BIBLIOGRAPHY

- <http://biblioteca.uc3m.es/uhtbin/cgiirsi/x/uc3m/0/5?searchdata1=^B648> -, -.