SOFTWARE ENGINEERING

Degree in Computer Systems

Degree in Computer Systems

Code: 10801

Main Scientific Area: Production Engineering and Systems

Lecturer: Paulo Adriano Marques Sousa Teixeira

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 60h Total Workload: 100h

ECTS: 6,0

Objectives

This course aims to introduce the principles of software engineering and encourage students to use the tools and techniques most appropriate in the light of these principles throughout the development process of software systems.

This course has as its main objective to help students obtain skills to plan, manage and execute all the development process activities of a software system. Students will be encouraged to use a flexible and dynamic approach in the design and development of software systems, including a testing phase

Learning Outcomes

At the end of the course, students should be able to:

Understand the framework of the development of software systems;
Discuss general issues of the software development processes methodologies;
Develop a project following an appropriated development methodology;
Apply techniques for code optimization;
Perform the validation of the developed system.

Course Contents

1. Software Engineering

Introduction to Software Engineering
Software Life Cycle
The software development process

2. Software development process models

Waterfall model
Evolutionary Models
Object Oriented Models
Agile development methologies

3. Software architecture

Principles of architecture design
Architectural patterns and styles

4. Coding

Good programming practices
Software configuration management
Supporting tools

5. Software validation

Types of software tests
Tools and techniques for software testing

6. Software Quality

Product and process quality
CMMI model
ISO Standards

Recommended Bibliography

Pressman, R. S., Maxim, R.B. Software Engineering – A Practitioner's Approach, Eighth Edition, 2014

Dennis, A., Wixom, B. H., Tegarden, D. (2015). SYSTEMS ANALYSIS DESIGN An Object-Oriented Approach with UML. Wiley.

Unhelkar, B. (2018). Software Enginnering with UML. CRC Press.

Learning and Teaching Methods

This curricular unit aims to provide the students with tools for carry on a rigorous approach in the software development.

The first chapter explains what is software engineering. The second one presents the main software process development models, taking into account the advantages and disadvantages of each model. In the end of this chapter, the agile software development principles will be explained in detail.

Chapter three will explore the issues of software architectures to provide students with knowledge about how to organize software components and their interconnections. Good coding practices and the use of software development support tools will be included in chapter four.

The last two chapters consist of the software validation and the aspects related with the software process quality and the software internal quality.

In order to put into practice the knowledge acquired, students will execute and manage the development of a software application, adopting an agile approach in the execution of the software development process activities

Assessment Methods

Learning outcomes will be assessed through (a) a theoretical component and (b) a practical component. The theoretical component consists of individual written tests and the practical component consists of the development of

a project team. The practical component will be held during the lessons.

The theoretical component grade results from the assessment by written tests or, if the student has not obtained the minimum score in the theoretical component or in the final grade, it corresponds to the exam score. The final grade (FG) is a weighted average calculated according to the expression:

FG = Theoretical Component * 50% + Practical Component * 50%

Approval for the course is subject to obtaining a minimum score of 9.0 (scale from 0 to 20) in the theoretical component. The final exam only assesses the theoretical component, keeping, for the calculation of the final grade, the value obtained in the practical component at the frequency of the course