# Software Engineering

**Academic Year: ( 2019 / 2020 )** **Review date: 05-05-2020**

**Department assigned to the subject: Computer Science and Engineering Department**

**Coordinating teacher: ALVAREZ RODRIGUEZ, JOSE MARIA**

**Type: Compulsory ECTS Credits : 6.0**

**Year : 2 Semester : 1**

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

Writing and Communication Skills
Principles of Software Development

## OBJECTIVES

General Competences
CG-1. Apply appropriate theoretical and practical methods to the analysis, design and troubleshooting, providing solutions that respect the rules of accessibility, ergonomics and safety at work and to comply with existing legislation.

Specific Competences Common to Computer Engineering
CECRI-1. Capacity to design, develop, select and evaluate applications and systems, ensuring their reliability, safety and quality, according to ethical principles and legislation and regulations.
CECRI-4. Capacity to develop the technical specifications of a computer facility that meets the standards and regulations.
CECRI-8. Ability to analyze, design, build and maintain applications in a robust, secure and efficient choosing the paradigm and the most appropriate programming languages.
CECRI-16. Knowledge and application of the principles, methodologies and life cycles of software engineering.

## DESCRIPTION OF CONTENTS: PROGRAMME

Block I. Requirements engineering
Unit 1. Introduction to requirements engineering
Unit 2. Elicitation, description and management of requirements
Unit 3. Properties, attributes and organization of requirements
Unit 4. Types of requirements

Block II. Conceptual modeling with UML
Unit 5. Introduction to conceptual modeling
Unit 6. Conceptual modeling: classes and objects
Unit 7. Conceptual modeling: associations
Unit 8. Conceptual modeling: hierarchies

Block III. Architectural modeling with UML
Unit 9. Introduction to architectural modeling
Unit 10. Architectural modeling: components
Unit 11. Architectural modeling: interfaces
Unit 12. Architectural modeling: design by contracts

## LEARNING ACTIVITIES AND METHODOLOGY

Theoretical Lectures: 1 ECTS
Practical Lectures: 1 ECTS
- Exercise resolution
- General tutoring
- Partial oral expositions of the project

Team Work: 3 ECTS
- Proposal of project statement
- Project development
- Project peer review

- Proposal of questions for final exam

Individual Work: 1 ECTS
- Contribution to team project
- Study and preparation of final exam

## ASSESSMENT SYSTEM

CONTINUOUS EVALUATION (40%)
- Lab exercises: 10%
- 1-minute quizz: 10%
- Partial deliveries of the final project 10%
- Proposal of questions for final exam: 10%

FINAL EVALUATION (60%)
- Final project report: 30%
- Final examination: 30%

A minimum grade of 5.0 both in the final project report and in the final examination is required to pass the course.

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| **% end-of-term-examination:** | 60 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 40 |

## BASIC BIBLIOGRAPHY


- Alexander, I. and Stevens, R. Writing Better Requirements, Addison-Wesley, 2002
- Arlow, J. and Neustadt, I. UML and the Unified Process. Practical Object-Oriented Analysis & Design, Addison-Wesley, 2002
- Braude, E. Software Engineering. An Object-Oriented Perspective., John Wiley & Sons, 2001..
- ESA Board for Software Standardisation and Control (BSSC). ESA Software Engineering Standards., European Space Agency, February 1991..
- Fowler, M. and Scott, K. UML Distilled. A Brief Guide to the Standard Object Modeling Language, Addison-Wesley, 2004
- Larman, C. Applying UML and Patterns. An Introduction to Object-Oriented Analysis and Design and the Unified Process, Prentice Hall, 1998
- Pressman, Roger S. Ingeniería del software: un enfoque práctico, 6ª ed., McGraw-Hill, 2006..
- Sommerville, I. Ingeniería del Software., Pearson-Addison Wesley, 2005..
- Sommerville, I. and Sawyer, P. Requirements Engineering: A Good Practice Guide, John Wiley & Sons, 1997
- Stevens, P. and Pooley, R. Using UML, Software Engineering with Objects and Components, Addison-Wesley, 2000
- Wiegers, K. and Beaty, J. Software Requirements, Microsoft Press, 2013


## BASIC ELECTRONIC RESOURCES

- UC3M . The Software Architect Code: Building the Digital World: https://www.edx.org/course/software-architect-code-building-digital-uc3mx-inf-1x
- edX Platform . List of courses in Software Engineering: https://www.edx.org/course?search_query=SOFTWARE+ENGINEERING