Software Engineering

Academic Year: (2021 / 2022) **Review date: 30-06-2021**

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 (1st course, 1st semester)

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-Practical Lectures: 1 ECTS
- Review of contents before class

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 the theoretical exam

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

ASSESSMENT SYSTEM

CONTINUOUS EVALUATION (70%)
- Week 6, Individual theoretical mid-term exam block I: Requirements Engineering: 10%
- Week 7, 1st final project (team) delivery (and presentation): 10%
- Week 10, Individual theoretical mid-term exam block II: Conceptual Modelling: 10%
- Week 13, 2nd final project (team) delivery (and presentation) : 10%
- Week 14, Individual theoretical mid-term exam block III: Architectural Modelling: 10%

- Week 14, Delivery of two individual practical exercises: 10%
- Week 3, 4, 5, 7, 8, 9, 11, 12, 13, 1-minute quizzes: 10%

FINAL EVALUATION (30%)
- Final project, complete technical report: 20%
- Group proposal of exam-type questions: 10%

A minimum grade of 4.5 is required in each partial exam and the aggregated grade must be greater or equal 5 to pass the theoretical part. In the case of failing some of the blocks, the student shall make a FINAL THEORETICAL EXAM ONLY including the failed blocks.

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

% end-of-term-examination:	30
% of continuous assessment (assigments, laboratory, practicals…):	70

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
- Martin Fowler Patterns of Enterprise Application Architecture, Addison-Wesley , 2002
- Martin Fowler Refactoring, Addison-Wesley , 2018
- Pressman, Roger S. Ingeniería del software: un enfoque práctico, 6ª ed., McGraw-Hill, 2006..
- Robert Martin Clean Code: A Handbook of Agile Software Craftsmanship, Prentice Hall, 2008
- Robert Martin Clean Architecture, Prentice-Hall, 2017
- 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

- IEEE Software Special Issue . 50 Years of Software Engineering: https://ieeexplore.ieee.org/document/8474511
- Ian Sommerville . Software Engineering, Tenth Edition: https://iansommerville.com/software-engineering-book/
- 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 on Software Engineering: https://www.edx.org/course?search_query=SOFTWARE+ENGINEERING