Course guide
270083 - ER - Requirements Engineering

Last modified: 30/01/2024

Unit in charge: Barcelona School of Informatics
Teaching unit: 747 - ESSI - Department of Service and Information System Engineering.

Degree: BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: MARIA RIBERA SANCHO SAMSO

Others:

Primer quadrimestre:
SERGIO MORALES GARCIA - 11, 13, 14
INMACULADA RAMIREZ PEREZ - 11, 21, 22
MARIA RIBERA SANCHO SAMSO - 11, 12, 13, 14, 21, 22
ERNEST TENIENTE LOPEZ - 11, 12, 13, 14, 21, 22

Segon quadrimestre:
SERGIO MORALES GARCIA - 12
INMACULADA RAMIREZ PEREZ - 11, 13
MANUEL RELLO SALTOR - 11, 12, 13
MARIA RIBERA SANCHO SAMSO - 11, 12, 13
ERNEST TENIENTE LOPEZ - 11, 12, 13

PRIOR SKILLS

- An overview of software engineering, and the role it plays in Requirements Engineering
- Basic elements of conceptual modeling in UML / OCL
- Organizations, economic environment, decision-making.
- English reading level.

REQUIREMENTS

- Prerequisite EEE
- Prerequisite IES

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CES2.1. To define and manage the requirements of a software system.
CSI3.5. To propose and coordinate changes to improve the operation of the systems and the applications.
CSI4.1. To participate actively in the specification of the information and communication systems.

Generical:
G6. SOLVENT USE OF THE INFORMATION RESOURCES: To manage the acquisition, structuring, analysis and visualization of data and information of the field of the informatics engineering, and value in a critical way the results of this management.

TEACHING METHODOLOGY

The course will primarily (but not completely) be taught using the teaching method PBL (Problem Based Learning).

There is a class (conventional) two hours a week in which the teacher presents the topics of the course and all aspects that are not sufficiently covered by other activities. The class also provides a good solution to the exercise of the previous week.

The second main activity of the course is the determination of the requirements of a particular software system. The teacher sketches a specific situation (different from one course to another), for which students have to determine and specify the requirements of a software system, using some methods and languages ¿¿to be learned previously. This work is performed in group. The number of people and the composition of the group is defined at the beginning of the course (no more than five/six). Each group appoints a coordinator. Each group meets at least once a week for two hours, the hours of laboratory classes. The group submits its work in five deliverables during the course, within limits fixed at the beginning of the course.

Each project meeting consists of three parts: During the first part each student explains the individual work done during the week and the group consolidates the work done by each member; During the second part the group progress towards the new project aspects that must be taken over; the third part is the planing of what will be done during next week, and who will.

The third major activity is the course exercises. The teacher proposes several exercises during the course. Each student must submit (via Athena) his own solution to the exercises, within the specified deadline. The completion of the exercise requires learning new skills.

Note: The teaching method used in the course requires students to acquire new knowledge independently, using bibliographic sources that are normally in English. It is essential that the student has a sufficient level of English without much difficulty assimilating the literature (technical).

LEARNING OBJECTIVES OF THE SUBJECT

1.Understanding the need, objectives and contexts in which engineering requirements activities are performed
2.Knowing defining the objectives of a project.
3.Knowing identifying stakeholders of a porject.
4.Understanding what isthe system context, the boundary of the system and the use cases.
5.Knowing defining a business process in a particular language.
6.Understanding the need to perform a detailed state of the art of the professional practice within the scope of a project.
7.Knowing performing a detailed state of the art of professional practice within the scope of a project.
8.Understanding what are the scenarios and use cases of a system and what are the relations among them.
9.Knowing defining the use cases of a system by using a particular template.
10.Knowing what are the software system requirements and into what types are classified.
11.Knowing the methods to specify the requirements and contexts in which they are useful.
12.Knowing what the conflicts of requirements engineering, how to analyze them and how to solve them.
13.Understanding the need for argumentation satisfaction of goals on a project.
14.Knowing performing argumentation satisfaction of goals.
15.Knowing writing the requirements specification by using a particular template.
16.Knowing the methods to validate the requirements and in which contexts they are useful.
17.Knowing validating a requirements specification through inspection.
18.Understaing the need of performing the conceptual schema.
19.Knowing developing the conceptual schema from the requirerments of a project.
20.Knowing writing a conceptual schema in an executable language.
21.Understanding the relations among the artifacts of requirements engineering, and the need to keep the traceability and consistency.
22.Knowing validating a conceptual schema through inspection.

STUDY LOAD

Type	Hours	Percentage
Hours small group	30,0	20.00
Self study	90,0	60.00
Hours large group	30,0	20.00

Total learning time: 150 h

CONTENTS

Overview of requirements engineering

Project goals

Stakeholders

The system and its context

Scenarios and use cases

Software requirements

Satisfaction argument of goals.

Requirements engineering activities: Determination of requirements, documentation, negotiation and validation

Conceptual modeling in requirements engineering

Development of the conceptual schema

Traceability of requirements engineering artifacts

Validation of conceptual schemas

ACTIVITIES

Introduction

Specific objectives:
1

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

Goals project

Specific objectives:
2, 3

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

E1

Description:
Exercise on project goals.

Specific objectives:
2

Requirements

Specific objectives:
2, 3, 10, 13, 14

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

E2

Description:
Exercise on satisfaction argument

Specific objectives:
13, 14

Introduction to requirements engineering

Specific objectives:
4, 5

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

Delivering state of the art

Specific objectives:
6, 7

Related competencies :
G6. SOLVENT USE OF THE INFORMATION RESOURCES: To manage the acquisition, structuring, analysis and visualization of data and information of the field of the informatics engineering, and value in a critical way the results of this management.

System, context, use cases

Specific objectives:
4, 5, 6, 7

Related competencies :
G6. SOLVENT USE OF THE INFORMATION RESOURCES: To manage the acquisition, structuring, analysis and visualization of data and information of the field of the informatics engineering, and value in a critical way the results of this management.

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

E3

Description:
Modeling business processes

Specific objectives:
5

Determining requirements

Specific objectives:
9, 10, 11

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

E4

Description:
Exercise on essential and real use cases

Specific objectives:
8, 9

Negotiating requirements

Specific objectives:
12

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

D1

Description:
Preliminary delivery on requirements specification

Specific objectives:
2, 3, 4, 8, 9, 10, 15

Validation requirements

Specific objectives:
16, 17

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

E5

Description:
Exercise on validation requirements

Specific objectives:
16, 17

Recap on requirements

Specific objectives:
2, 3, 4, 8, 9, 10, 13, 14, 15, 16, 17, 21, 22

Full-or-part-time: 9h
Theory classes: 1h
Laboratory classes: 2h
Self study: 6h

Q1

Description:
Questionnaire on basic concepts of requirements engineering. Each student must bring a laptop or similar to access and respond to the questionnaire.

Specific objectives:
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

Related competencies :
G6. SOLVENT USE OF THE INFORMATION RESOURCES: To manage the acquisition, structuring, analysis and visualization of data and information of the field of the informatics engineering, and value in a critical way the results of this management.

Full-or-part-time: 2h
Guided activities: 2h

D2

Description:
Final delivery of the requirements specification

Specific objectives:
2, 3, 4, 8, 9, 10, 11, 13, 14, 15, 16, 17

Conceptual modeling in requirements engineering

Specific objectives:
18, 20, 21

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

E6

Description:
Exercise on the executable OCL

Specific objectives:
20

The structural scheme

Specific objectives:
19, 20

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

E7

Description:
Exercise making structural scheme

Specific objectives:
19, 20

The scheme behavior

Specific objectives:
19, 20

Full-or-part-time: 12h
Theory classes: 2h
Laboratory classes: 4h
Self study: 6h

D3

Description:
Preliminary delivery of conceptual schema of the project

Specific objectives:
19, 20

Validating conceptual schema

Specific objectives:
20, 21, 22

Full-or-part-time: 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h

E8

Description:
Exercise on schema validation

Specific objectives:
21, 22

Recap subject

Specific objectives:
18, 19, 20, 21, 22

Full-or-part-time: 9h
Theory classes: 1h
Laboratory classes: 2h
Self study: 6h

Completion of the final delivery of the conceptual scheme

Specific objectives:
19, 20, 22

Full-or-part-time: 6h
Self study: 6h

D4

Description:
Final delivery of conceptual schema

Specific objectives:
19, 20, 21, 22

Q2

Description:
Questionnaire on basic concepts of conceptual modeling in requirements engineering. The questionnaire will be answered online within the class. Each student must bring a laptop or similar to access and respond to the questionnaire.

Specific objectives:
18, 19, 20, 21, 22

Full-or-part-time: 2h
Guided activities: 2h

GRADING SYSTEM

The generic competence assigned to the course is graded with values A, B, C, D, where:
· A indicates that the competence has been accomplished with a level of excellence
· B indicates that the competence has been accomplished with the desired level
· C indicates that the competence has been accomplished with a sufficient level
· D indicates that the competence has not accomplished
This grade comes from the evaluation of the first deliverable of the project (Context analysis).

BIBLIOGRAPHY

Basic:
- Pohl, K. Requirements engineering: fundamentals, principles, and techniques. Springer, 2010. ISBN 978-3-642-12577-5.
- van Lamsweerde, A. Requirements engineering: from system goals to uml models to software specifications. Wiley, 2009. ISBN 9780470012703.
- Robertson, S.; Robertson, J. Mastering the requirements process: getting requirements right. 3rd ed. Addison-Wesley, 2006, 2013. ISBN 9780321815743.
- Olivé, A. Conceptual modeling of information systems. Springer, 2007. ISBN 9783540393894.

Complementary:
- Aurum, A.; Wohlin, C. (eds.). Engineering and managing software requirements. Springer, 2005. ISBN 3540250433.