



Universitat de Lleida

DEGREE CURRICULUM **QUALITY CERTIFICATION AND AUDIT**

Coordination: ROBERTO GARCIA GONZÁLEZ

Academic year 2013-14

Subject's general information

Subject name	Quality certification and audit
Code	103057
Semester	2nd Semester
Typology	Mandatory
ECTS credits	3
Theoretical credits	3
Practical credits	0
Coordination	ROBERTO GARCIA GONZÁLEZ
Department	Informàtica i Enginyeria Industrial
Teaching load distribution between lectures and independent student work	Total load: 75h - Lectures = 22,5h - Independent student work = 52,5h
Important information on data processing	Consult this link for more information.
Language	English
Office and hour of attention	To be agreed, contact rgarcia@diei.udl.cat

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Subject's extra information

The subject covers:

- First, a general view of quality as a tool for the improvement of organization processes, increasing efficiency and efficacy
- Second, it concretises the quality concept into methodologies and processes for quality in software development

Learning objectives

- **Objective 1.1.** To know the motivations and advantages of quality management
- **Objective 2.1.** To understand the principles of quality management
- **Objective 2.2.** To know the fundamentals of planning, deploying and verifying a quality management system
- **Objective 2.3.** To understand quality in the context of software development
- **Objective 2.4.** To be able to apply methodologies and tools that improve the quality during software applications development

Competences

- **Competence 1.** Motivate quality and continuous improvement
- **Competence 2.** Being able to ensure, manage, audit and certify the quality of software developments, processes, systems, services, applications and products

Subject contents

1. Quality management and certification

- What is quality?
- Efficiency and effectiveness
- Organisation processes
- Planning a quality management system
- Implementing a quality management system
- Verifying a quality management system
- Certifying a quality management system

2. Software quality

- Characteristics and principles of quality management in software development
- Techniques to improve software quality
- Verifying software quality
- Collaborative development
- Developer testing
- Software defects detection
- Software quality evolution and improvement
- Quality improvement strategies and techniques

Methodology

Theory Sessions

Contents are presented and discussed in the classroom, in some cases accompanied by demos and videos, and

illustrated using examples.

Project based learning (mini-project)

Scenario: software development company (concrete domain to be defined by the students)

- Define organisation processes and quality system
- Apply techniques that improve the software development process quality

The project is developed by student groups (2 or 3 members preferred)

Deliverables:

- Week 3:
 - Activity 1: Define software company quality objectives
- Week 5:
 - Activity 2: Design software company processes (marketing, development and customer services)
- Week 6:
 - Activity 3: Mini-project 1st iteration. Description
- Week 8:
 - Activity 4: Mini-project 1st iteration. Version Control
- Week 11:
 - Activity 5: Mini-project 1st iteration. Formal Inspection
- Week 13:
 - Activity 6: Mini-project 2nd iteration. Reviewed & Tested
- Week 15:
 - Activity 7: Mini-project 3rd iteration. Refactored

Students Expected Involvement

- Attend in-class sessions
- Download lessons from the Virtual Campus
- Study lessons and complete proposed exercises
- Complete activities (mini-project)
- Deliver activities using the Virtual Campus
- Receive grades and comments about activities
- Participate in Virtual Campus forums

Development plan

Week	Activity	Activity Delivery Week	Classroom (hours)	Non-Class (hours)
1	What is quality? Efficiency and effectiveness		1,5	0,5
2	Organisation processes Planning, deploying, auditing and certifying a quality management system		1,5	0,5
	Activity 1: Define software company quality objectives	3		2
3	Characteristics and Principles of Quality Management in Software Development		1,5	0,5
	Activity 2: Design software company processes (marketing, development and customer services)	5		4
4	Techniques for Improving Software Quality		1,5	0,5

5	Test driven development		1,5	0,5
	Activity 3: Mini-project 1st iteration. Description	6		6
6	Collaborative construction. Pair programing		1,5	0,5
7	Collaborative construction. Version Control		1,5	0,5
	Activity 4: Mini-project 1st iteration. Version Control	8		6
8	MIDTERM EXAM		1,5	
9	Collaborative construction. Formal inspection and other collaborative development practices		1,5	0,5
	Activity 5: Mini-project 1st iteration. Formal Inspection	11		10
10	Developer testing		1,5	0,5
11	Developer testing		1,5	0,5
	Activity 6: Mini-project 2nd iteration. Reviewed & Tested	13		9
12	Refactoring		1,5	0,5
13	Refactoring		1,5	0,5
	Activity 7: Mini-project 3rd iteration. Refactored	15		9
14	Debugging		1,5	0,5
15	Programming Kata in-class exercise		1,5	0,5
F	FINAL EXAM		1,5	
R	RESIT EXAM			

Evaluation

Assessment based mainly on mini-project activities deliverables and midterm/final exams

Activities correspond to applying theoretical concepts to the mini-project

Activities are delivered using the Virtual Campus and following the previous schedule

Final Grade

- Activities 1 and 2: 5% (2,5% each)
- Activity 3: 10%
- Midterm exam: 15%
- Activity 4: 5%
- Activities 5, 6 and 7: 30% (10% each)
- Final exam: 35%

Bibliography

Fundamental Bibliography

Steve McConnell: "Code Complete, 2nd edition".

Microsoft Press, 2004

ISBN: 9780735619678

Additional Bibliography

Petar Tahchiev, Felipe Leme, Vincent Massol, Gary Gregory: "JUnit in Action, 2nd Edition".
Manning, 2010
ISBN: 9781935182023