



# Master Thesis

## Learning Guide – Information for Students

### 1. Description

<b>Grade</b>	Máster Universitario en Ingeniería de Software - European Master on Software Engineering
<b>Module</b>	Final Master Thesis
<b>Area</b>	
<b>Subject</b>	Master Thesis
<b>Type</b>	Compulsory
<b>ECTS credits</b>	30
<b>Responsible department</b>	Computer Languages and Systems and Software Engineering
<b>Major/Section/</b>	

<b>Academic year</b>	2012/2013
<b>Term</b>	4 <sup>th</sup> term
<b>Language</b>	English
<b>Web site</b>	



## 2. Faculty

<b>NAME and SURNAME</b>	<b>OFFICE</b>	<b>email</b>
Ricardo Imbert (Coord.)	5112	rimbert@fi.upm.es
Xavier Ferré	5112	xavier.ferre@upm.es

## 3. Prior knowledge required to take the subject

<b>Passed subjects</b>	<ul style="list-style-type: none"><li>•</li></ul>
<b>Other required learning outcomes</b>	<ul style="list-style-type: none"><li>•</li></ul>



## 4. Learning goals

<b>SUBJECT-SPECIFIC COMPETENCES AND PROFICIENCY LEVEL</b>		
<b>Code</b>	<b>Competence</b>	<b>Level</b>
SC1	To perform a project plan to coordinate and prioritize resources and activities, in order to obtain the expected results within the deadlines, costs and quality required.	S (*)
SC2	To carry out a software project monitoring and to make corrective decisions whenever is needed.	S (*)
SC3	To perform an estimation of a software project parameters.	S (*)
SC4	To apply the development process models to the characteristics of a software project	S (*)
SC5	Elicit, analyze and specify the clients, users and other stakeholders' needs, taking into account the possible factors affecting the development of the system.	S (*)
SC6	To design the unit tests and to learn to design integration and implantation tests. To perform the system integration, integration tests and implantation of the system.	S (*)
SC7	To produce a verification and validation plan to coordinate and prioritize resources and activities to assess the required quality level.	S (*)
SC8	Apply the most appropriated verification and validation techniques for a software development project, within the framework of a verification and validation plan	S (*)
SC9	To define, evaluate and improve and organization's software processes	S (*)
SC10	To evaluate objectively processes and products vs. standards and applicable norms	S (*)
SC11	To identify, control, inform and audit a system configuration and its changes.	S (*)
SC12	To conceive and perform the design of software systems, assuring relevant quality attributes.	S (*)



SC13	To have a vision of the different specific and emergent aspects of the Software Engineering, and to go further in some of them.	S
SC14	To understand what nowadays software engineering procedures can and cannot reach, their limitations and their possible future evolution.	S (*)
PGC20	To establish connections between desires and needs of the consumer or client and what technology can offer	A (*)
PGC21	To decide among acquiring, developing or applying technology along the wide range of processes, products and services of a company or institution	A (*)
PGC22	To understand the market and its product or service tendencies and needs	A (*)
PGC23	To develop and implement computer based solutions in a professional environment	A (*)

Proficiency level: knowledge (K), comprehension (C), application (A), and analysis and synthesis (S)  
(\* ) The Master Thesis will cover the specific competences of the subject or subjects related to the work context.



<b>SUBJECT LEARNING OUTCOMES</b>			
<b>Code</b>	<b>Learning outcome</b>	<b>Related competences</b>	<b>Proficiency level</b>
LR1	Proposes a justified solution to a complex or not-well defined real problem, to a new or emerging area real problem or to one requiring the development of new and original approaches or methods, in the context of Software Engineering, providing both a qualitative and quantitative way.	SC13, SC14 (*)	S
LR2	Settles the solution project management (requirements, planning, scheduling, monitoring...)	SC1, SC2, SC3, SC4, SC5, SC7, SC11 (*)	S
LR3	Concretes the proposed solution to a given problem in terms of code, prototypes, reports, concept proof, analysis, design and documentation	SC5, SC6, SC8, SC9, SC10, SC12 (*)	S
LR4	Presents and defends the proposed solution in a non-ambiguous, clear way, both for the specialized and non-specialized audience.	SC11, PGC20, PGC21, PGC22, PGC23 (*)	S

(\*) The Master Thesis will cover the specific competences of the subject or subjects related to the work context.



## 5. Subject assessment system

<b>CONTINUOUS ASSESSMENT</b>			
<b>Brief description of assessable activities</b>	<b>Time</b>	<b>Place</b>	<b>Weight in grade</b>
Defense of the Master Thesis	Week 16	Defense room	100%
<b>Total: 100%</b>			

## 6. Brief description of organizational modalities and teaching methods

<b>TEACHING ORGANIZATION</b>		
<b>Scenario</b>	<b>Organizational Modality</b>	<b>Purpose</b>
	<b>Theory Classes</b>	<i>Talk to students</i>
	<b>Seminars/Workshops</b>	<i>Construct knowledge through student interaction and activity</i>
	<b>Practical Classes</b>	<i>Show students what to do</i>
	<b>Placements</b>	<i>Round out student training in a professional setting</i>
	<b>Personal Tutoring</b>	<i>Give students personalized attention</i>
	<b>Group Work</b>	<i>Get students to learn from each other</i>
	<b>Independent Work</b>	<i>Develop self-learning ability</i>



<b>TEACHING METHODS</b>		
	<b>Method</b>	<b>Purpose</b>
	<b>Explanation/Lecture</b>	<i>Transfer information and activate student cognitive processes</i>
	<b>Case Studies</b>	<i>Learning by analyzing real or simulated case studies</i>
	<b>Exercises and Problem Solving</b>	<i>Exercise, test and practice prior knowledge</i>
	<b>Problem-Based Learning (PBL)</b>	<i>Develop active learning through problem solving</i>
	<b>Project-Oriented Learning (POL)</b>	<i>Complete a problem-solving project applying acquired skills and knowledge</i>
	<b>Cooperative Learning</b>	<i>Develop active and meaningful learning through cooperation</i>
	<b>Learning Contract</b>	<i>Develop independent learning</i>

Known as explanation, this teaching method involves the “*presentation of a logically structured topic with the aim of providing information organized according to criteria suited for the purpose*”. This methodology, also known as *lecture*, mainly focuses on the verbal exposition by the teacher of contents on the subject under study. The term *master class* is often used to refer to a special type of lecture taught by a professor on special occasions

Intensive and exhaustive analysis of a real fact, problem or event for the purpose of understanding, interpreting or solving the problem, generating hypotheses, comparing data, thinking, learning or diagnosis and, sometimes, training in possible alternative problem-solving procedures.

Situations where students are asked to develop the suitable or correct solutions by exercising routines, applying formulae or running algorithms, applying information processing procedures and interpreting the results. It is often used to supplement lectures.

Teaching and learning method whose starting point is a problem, designed by the teacher, that the student has to solve to develop a number of previously defined competences.

Teaching and learning method where have a set time to develop a project to solve a problem or perform a task by planning, designing and completing a series of activities. The whole thing is based on developing and applying what they have learned and making effective use of resources.

Interactive approach to the organization of classroom work where students are responsible for their own and their peers’ learning as part of a co-responsibility strategy for achieving group goals and incentives. This is both one of a number of methods for use and an overall teaching approach, or philosophy.

An agreement between the teacher and student on the achievement of learning outcomes through an independent work proposal, supervised by the teacher, and to be accomplished within a set period. The essential points of a learning contract are that it is a written agreement, stating required work and reward, requiring personal involvement and having a time frame for accomplishment.



**BRIEF DESCRIPTION OF THE ORGANIZATIONAL MODALITIES AND TEACHING METHODS**

**INDIVIDUAL WORK**

Students will develop, present and defend an original work individually performed. This work consists in an integral project of Software Engineering synthesizing the competences acquired in the subjects. Students will perform a document including the main contents of the development work.

**PERSONAL TUTORING**

Students will be assigned to a Master Thesis advisor, which will guide them in the definition of the thesis context and the work planning, and will supervise them through periodic personal tutoring meetings. The Master Thesis advisor will guide the students in the performance of the Master Thesis document and in the preparation of the Thesis defense.