UNIVERSIDAD POLITÉCNICA DE MADRID
FACULTAD DE INFORMÁTICA
Campus de Montegancedo
Boadilla del Monte. 28660 Madrid

Models and Methods for Process Improvement and Assessment

Learning Guide – Information for Students

1. Description

Grade	Máster Universitario en Ingeniería del Software - European Master on Software Engineering
Module	
Area	Project Management and Organizational Processes
Subject	Models and Methods for Process Improvement and Assessment
Type	Compulsory
ECTS credits	4
Responsible department	Lenguajes y Sistemas Informáticos e Ingeniería de Software
Major/Section/	

Academic year	2012/2013
Term	1st term
Language	English
Web site	

2. Faculty

NAME and SURNAME	OFFICE	email
Jose Antonio Calvo-Manzano Villalón (Coord.)	5106	jacalvo@fi.upm.es

3. Prior knowledge required to take the subject

Passed subjects	•
Other required learning outcomes	• KNOWLEDGE ABOUT SOFTWARE DEVELOPMENT PROCESS AND THEIR RELATED TASKS

4. Learning goals

SUBJECT-SPECIFIC COMPETENCES AND PROFICIENCY LEVEL		
Code	**Competence**	**Level**
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
SC4	To apply the development process models to the characteristics of a software project	S

Proficiency level: knowledge (K), comprehension (C), application (A), and analysis and synthesis (S)

SUBJECT LEARNING OUTCOMES			
Code	**Learning outcome**	**Related competences**	**Proficiency level**
LR1	To be able of defining, assessing and improving software processes in an organization	SC9, SC10	
LR2	To be able of leading organizational change	SC4, SC9	
LR3	To be able of introducing improvements in an organization	SC10	

5. Subject assessment system

ACHIEVEMENT INDICATORS		
Ref	**Indicator**	**Related to LR**
I1	Performing an assessment	LR1
I2	Organizing a working group	LR2
I3	Generating an assessment and the action plans	LR3

(Optionally, use rubric table instead)

CONTINUOUS ASSESSMENT			
Brief description of assessable activities	**Time**	**Place**	**Weight in grade**
Work in class (participation)	1-15th Week	Class	30%
Test of Chapters 1 to 7	13th Week	Class	30%
Work in group	14-15th Week	Class	40%
			Total: 100%

GRADING CRITERIA

Models and Methods for Process Improvement and Assessment subject has three main assessment activities with different weights:

Active participation of students during the classes (30%).

Theory test related to Chapters 1-4 (30%).

Individual or group research work (40%). This activity is divided into two ones. One related to the individual skills in communications (20%) and the other one related to the memory of the work itself (20%).

Students should have a rate greater o equal to 5.00 (over 10.00) to pass the subject.

6. Contents and learning activities

SPECIFIC CONTENTS		
Unit / Topic / Chapter	**Section**	**Related indicators**
Chapter 1: Introduction	1.1 State of the practice	LR1
	1.2 Process improvement concepts	LR1
Chapter 2: Process improvement lifecycles	2.1 IDEAL	LR1, LR2, LR3
	2.2 ISO 15504	LR1, LR2, LR3
	2.3 Action Focus Improvement Model (AFIM): Commitment, Assessment, Action Plan, Implementation	LR1, LR2, LR3
	2.4 Process Components	LR1
Chapter 3: CMMI Constellations	3.1 Representations and Contents	LR1
	3.2 Maturity Levels and Capability Levels	LR1
	3.3 Institutionalization	LR1
Chapter 4: CMMI-Development	4.1 Process Management Category	LR1
	4.2 Project Management Category	LR1
	4.3 Engineering Category	LR1
	4.4 Support Category	LR1
Chapter 5: Service Management Process Models	5.1 CMMI-Services	LR1
	5.2 Information Technology Infrastructure Library (ITIL)	LR1
Chapter 6. CMMI Acquisition	6.1 CMMI-ACQ	LR1

7. Brief description of organizational modalities and teaching methods

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

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

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	
THEORY CLASSES	During a theory class, the teacher explains verbally the contents of the chapter. In this way, he provides students basic information from different sources.
PROBLEM-SOLVING CLASSES	The teacher will present an assessment problem to be solved by students. He will provide the main guidelines for solving it and students will end the process.
PRACTICAL WORK	
INDIVIDUAL WORK	Student will learn to work individually in order to prepare oral presentations and written documents. In this method, the student will have to collect information from internet and the bibliography.
GROUP WORK	This work is complementary to the individual work. The objective is to encourage the cooperative learning, in order to divide the research work, the written document and the oral presentation, and put all of it together.
PERSONAL TUTORING	Students could ask, individually or in groups, for tutoring sessions in order to solve of the issues they have.

8. Teaching resources

TEACHING RESOURCES	
RECOMMENDED READING	McFeeley, B.; *IDEAL^{SM}: A Users's Guide for Software Process Improvement*; Handbook CMU/SEI-96-HB-001; February 1996
	SCAMPI Upgrade Team; *Standard CMMI® Appraisal Method for Process Improvement (SCAMPI^{SM}) A, Version 1.3: Method Definition Document*; Handbook CMU/SEI 2011-HB-001; March 2011
	CMMI Product Team; *CMMI® for Development, Version 1.3, CMMI-DEV, V1.3*; CMU/SEI-2010-TR-033; November 2010
	CMMI Product Team, *CMMI for Acquisition, v1.3(CMMI-ACQ)*; CMU/SEI-2010-TR-032; November 2010
	CMMI Product Team; CMMI for Services, v1.3(CMMI-SVC); CMU/SEI-2010-TR-034; November 2010
	ITIL -Information Technology Infrastructure Library (Service Strategy, Service Design, Service Transition, Service Operation, Continual Service Improvement)
WEB RESOURCES	Subject web site
	Subject Moodle site (http://moodle.upm.es/titulaciones/oficiales/course/view.php?id=3551)
EQUIPMENT	Laboratory
	Room XXXX
	Group work room

9. Subject schedule

Week	Classroom activities	Lab activities	Individual work	Group work	Assessment activities	Others
Week 1 (3 hours)	• Chapter 1 (2 hours)	• (hours)	• Individual study (1 hour)	•	• Class Participation	•
Week 2 (3 hours)	• Chapter 1 (2 hours)	• (hours)	• Individual study (1 hour)	•	• Class Participation	•
Week 3 (4 hours)	• Chapter 2 (2 hours)	• (hours)	• Individual study (2 hours)	•	• Class Participation	•
Week 4 (4 hours)	• Chapter 2 (2 hours)	• (hours)	• Individual study (2 hours)	•	• Class Participation	•
Week 5 (4 hours)	• Chapter 2 (2 hours)	•	• Individual study (2 hours)	•	• Class Participation	•
Week 6 (4 hours)	• Chapter 2 (2 hours)	•	• Individual study (2 hours)	•	• Class Participation	•
Week 7 (12 hours)	• Chapter 3 (2 hours)	•	• Individual study (2 hours) • Performing research work (6 hours)	• Performing research work (2 hours)	• Class Participation	•
Week 8 (10 hours)	• Chapter 3 (2 hours)	•	• Individual study (2 hours) • Performing research work (6 hours)	•	• Class Participation	•

Week 9 (10 hours)	• Chapter 3 (2 hours)	•	• Individual study (2 hours) • Performing research work (6 hours)	•	• Class Participation	•
Week 10 (15 hours)	• Chapter 4 (2 hours)	•	• Individual study (8 hours) • Performing research work (5 hours)	•	• Class Participation	•
Week 11 (15 hours)	• Chapter 5 (1 hour) • Chapter 6 (1 hour)	•	• Individual study (8 hours) • Performing research work (5 hours)	•	• Class Participation	•
Week 12 (2 hours)	•	•	•	•	• Test of Chapters 1 to 4 (2 hours)	•
Week 13 (2 hours)	• Presentations (2 hours)	•	•	•	• Presentation of the work • Skills in communication	•
Week 14 (2 hours)	• Presentations (2 hours)	•	•	•	• Presentation of a work • Skills in communication	•
Week 15 (2 hours)	• Presentations (2 hours)	•	•	•	• Presentation of a work • Skills in communication	•

Note: Student workload specified for each activity in hours