ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000486 - Models And Methods For Process Improvement And Assessments

DEGREE PROGRAMME

10AM - Master Universitario en Ingenieria del Software

ACADEMIC YEAR & SEMESTER

2020/21 - Semester 1

Index

Learning guide

1. Description

1.1. Subject details

Name of the subject	103000486 - Models And Methods For Process Improvement And Assessments
No of credits	4 ECTS
Type	Compulsory
Academic year ot the programme	First year
Semester of tuition	Semester 1
Tuition period	September-January
Tuition languages	English
Degree programme	10AM - Master Universitario en Ingenieria del Software
Centre	10 - Escuela Tecnica Superior de Ingenieros Informaticos
Academic year	2020-21

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Jose Antonio Calvo-Manzano Villalon (Subject coordinator)	5106	joseantonio.calvomanzano@upm.es	M - 10:00 - 13:00 W - 10:00 - 13:00
Tomas San Feliu Gilabert	5106	tomas.sanfeliu@upm.es	W - 10:00 - 13:00 Th - 10:00 - 13:00

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

The subject - recommended (passed), are not defined.

3.2. Other recommended learning outcomes

- Knowledge about the software life cycle processes (activities and tasks)

4. Skills and learning outcomes *

4.1. Skills to be learned

CE10 - Evaluar de forma objetiva los procesos y productos frente a los estándares y normas aplicables.

CE4 - Aplicar los modelos de proceso de desarrollo a las características de un proyecto software

CE9 - Definir, evaluar y mejorar los procesos software de una organización.

CG1 - Que los estudiantes sepan aplicar los conocimientos adquiridos y su capacidad de resolución de problemas en entornos nuevos o poco conocidos dentro de contextos más amplios (o multidisciplinares) relacionados con su área de estudio (RD)

CG17 - Habilidades de gestión y capacidad de liderar un equipo que puede estar integrado por disciplinas y niveles distintos

CG18 - Capacidad de trabajar y comunicarse también en contextos internacionales

CG3 - Que los estudiantes sepan comunicar sus conclusiones y los conocimientos y razones últimas que las sustentan a públicos especializados y no especializados de un modo claro y sin ambigüedades (RD)

4.2. Learning outcomes

RA35 - Es capaz de definir, evaluar y mejorar los procesos software de una organización

RA36 - Posee dotes para liderar el cambio dentro de la organización

RA37 - Está capacitado para introducir mejoras en la organización

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

New technologies are changing our way of life: airplanes, trains, communications, e-commerce, etc, and all of them need software to run. However, software is developed with poor quality; overruns in resources, effort and budget; and delays in delivery. It means that organizations must improve their way of producing software. In this context, it appears software process improvement. It consists of applying consistently the practices that provide good results, and changing those that cause problems.

So, enterprises should know their capacity/maturity level in order to develop software. The reference models are CMMI Development, Acquisition and Services, ISO 15504, and ITIL among others. In order to be involved in a process improvement initiative, organizations should follow a process improvement lifecycle.

In this subject, and independently of the reference model used, a generic process improvement lifecycle oriented to large enterprises as well as small and medium-sized enterprises will be explained. In the main phase (the assessment phase), a method to make an assessment will be described. Students will have to make a plan in order to know the estimated hours and costs, resources and schedule involved in a process improvement initiative.

In the same way, a process improvement initiative in a small enterprise will be presented to students and they will have to analyse if the initiative is going to get benefits.

Later, the generic information related to the most known reference models (i.e., CMMI constellations) will be explained (maturity/capability levels, and institutionalization).

Finally, students will have to choose one of the processes of the ITIL model and make a brief analysis and presentation.

5.2. Syllabus

1. Introduction
    1.1. Maturity Profile
    1.2. State of the practice
    1.3. Process Improvement (PI) concepts & Justifying PI
2. PI life cycles
    2.1. IDEAL, ISO 15504, Action Focus Improvement Model (AFIM)
    2.2. AFIM: Commitment
    2.3. AFIM: Assessment
    2.4. AFIM: Infrastructure&Action Plans, and Implementation
    2.5. A PI initiative in a small company
3. Reference Process Models
    3.1. CMMI Model
    3.2. A process model focused on IT Services

6. Schedule

6.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Distant / On-line	Assessment activities
1	**Chapter 1: Maturity Profile Report** Duration: 00:30 Lecture **Chapter 1: State of the practice. Process Improvement (PI) concepts.** Duration: 01:30 Lecture		**Chapter 1: Maturity Profile Report** Duration: 00:30 Lecture **Chapter 1: State of the practice. Process Improvement (PI) concepts.** Duration: 01:30 Lecture	**Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
2	**Chapter 1: Justifying PI** Duration: 00:30 Lecture **Chapter 2: Process Improvement life cycles** Duration: 00:30 Lecture **Chapter 2: Process Improvement life cycles: AFIM: Commitment** Duration: 00:30 Lecture **Exercise related to ROI in Commitment** Duration: 00:30 Problem-solving class		**Chapter 1: Justifying PI** Duration: 00:30 Lecture **Chapter 2: Process Improvement life cycles** Duration: 00:30 Lecture **Chapter 2: Process Improvement life cycles: AFIM: Commitment** Duration: 00:30 Lecture **Chapter 2: Process Improvement life cycles: AFIM: Commitment** Duration: 00:30 Lecture	**Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
3	**Chapter 2: Process Improvement life cycles: AFIM: Commitment** Duration: 01:00 Lecture **Exercise related to ROI in Commitment** Duration: 01:00 Problem-solving class		**Chapter 2: Process Improvement life cycles: AFIM: Commitment** Duration: 01:00 Lecture **Exercise related to ROI in Commitment** Duration: 01:00 Problem-solving class	**Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
4	**Chapter 2: Process Improvement life cycles: AFIM: Assessment** Duration: 00:30 Lecture **Exercise related to ROI in Assessment** Duration: 00:30 Problem-solving class		**Chapter 2: Process Improvement life cycles: AFIM: Assessment** Duration: 00:30 Lecture **Exercise related to ROI in Assessment** Duration: 00:30 Problem-solving class	**Exercise related to ROI in Commitment** Other assessment Continuous assessment Presential Duration: 01:00 **Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00

5	**Chapter 2: Process Improvement life cycles: AFIM: Assessment** Duration: 01:30 Lecture **Exercise related to ROI in Assessment** Duration: 00:30 Problem-solving class		**Chapter 2: Process Improvement life cycles: AFIM: Assessment** Duration: 01:30 Lecture **Exercise related to ROI in Assessment** Duration: 00:30 Problem-solving class	**Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
6	**Chapter 2: Process Improvement life cycles: AFIM: Assessment** Duration: 01:30 Lecture **Exercise related to ROI in Assessment** Duration: 00:30 Problem-solving class		**Chapter 2: Process Improvement life cycles: AFIM: Assessment** Duration: 01:30 Lecture **Exercise related to ROI in Assessment** Duration: 00:30 Problem-solving class	**Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
7	**Chapter 2: Process Improvement life cycles: AFIM: Action Plan and Implementation** Duration: 00:30 Lecture **Exercise related to ROI in Action Plans and Implementation** Duration: 00:30 Problem-solving class		**Chapter 2: Process Improvement life cycles: AFIM: Action Plan and Implementation** Duration: 00:30 Lecture **Exercise related to ROI in Action Plans and Implementation** Duration: 00:30 Problem-solving class	**Exercise related to ROI in Assessment** Group work Continuous assessment Presential Duration: 01:00 **Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
8	**Chapter 2: Process Improvement life cycles: AFIM: Action Plans and Implementation** Duration: 01:00 Lecture **Exercise related to ROI in Action Plans and Implementation** Duration: 00:30 Problem-solving class **Exercise related to ROI in a Small Enterprise** Duration: 00:30 Problem-solving class		**Chapter 2: Process Improvement life cycles: AFIM: Action Plans and Implementation** Duration: 01:00 Lecture **Exercise related to ROI in Action Plans and Implementation** Duration: 00:30 Problem-solving class **Exercise related to ROI in a Small Enterprise** Duration: 00:30 Problem-solving class	**Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
9				**Exercise related to ROI in Action Plans and Implementation** Group work Continuous assessment Presential Duration: 01:00 **Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00 **Exercise related to ROI in Summary** Group work Continuous assessment Presential Duration: 01:00

10	**Exercise related to ITIL** Duration: 00:30 Problem-solving class **Chapter 3: Process Models oriented to services** Duration: 00:30 Lecture		**Exercise related to ITIL** Duration: 00:30 Problem-solving class **Chapter 3: Process Models oriented to services** Duration: 00:30 Lecture	**Exercise related to ROI in a Small Enterprise** Group work Continuous assessment Presential Duration: 01:00 **Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
11	**Chapter 3: CMMI** Duration: 02:00 Lecture		**Chapter 3: CMMI** Duration: 02:00 Lecture	**Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
12	**Chapter 3: CMMI** Duration: 02:00 Lecture		**Chapter 3: CMMI** Duration: 02:00 Lecture	**Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
13				**Exercise related to CMMI Concepts** Written test Continuous assessment Presential Duration: 01:00 **Presentation related to a selected Service Process** Individual presentation Continuous assessment Presential Duration: 01:00 **Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
14				**Presentation related to a selected Service Process** Individual presentation Continuous assessment Presential Duration: 02:00 **Discussion/Participating in class** Other assessment Continuous assessment Presential Duration: 01:00
15				
16				**Final Test** Written test Final examination Presential Duration: 02:00

17				

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The schedule is based on an a priori planning of the subject; it might be modified during the academic year, especially considering the COVID19 evolution.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
1	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG1 CG18
2	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG1 CG18
3	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG1 CG18 CE4 CE9 CE10
4	Exercise related to ROI in Commitment	Other assessment	Face-to-face	01:00	10%	5 / 10	CG1 CG3 CG18 CE4 CG17 CE9 CE10
4	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CE4 CE9 CE10 CG1 CG18
5	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG1 CG18 CE9 CE10
6	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG1 CG18 CE9 CE10
7	Exercise related to ROI in Assessment	Group work	Face-to-face	01:00	10%	5 / 10	CG1 CG3 CG18 CG17 CE9 CE10

7	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG1 CG18 CE9 CE10
8	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG1 CG18 CE4 CE9 CE10
9	Exercise related to ROI in Action Plans and Implementation	Group work	Face-to-face	01:00	10%	5 / 10	CG1 CG3 CG18 CG17 CE9 CE10
9	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CE9 CE10 CG1 CG18
9	Exercise related to ROI in Summary	Group work	Face-to-face	01:00	5%	5 / 10	CG1 CG3 CG18 CE4 CG17 CE9 CE10
10	Exercise related to ROI in a Small Enterprise	Group work	Face-to-face	01:00	10%	5 / 10	CG3 CG18 CG17 CG1 CE10
10	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG18 CE10 CG1 CG3
11	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG1 CG3 CG18 CE10
12	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1%	5 / 10	CG1 CG3 CG18 CE10
13	Exercise related to CMMI Concepts	Written test	Face-to-face	01:00	15%	5 / 10	CE9
13	Presentation related to a selected Service Process	Individual presentation	Face-to-face	01:00	12.5%	5 / 10	CG1 CG3 CG18 CE9

13	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1.5%	5 / 10	CG18 CE9 CG1 CG3
14	Presentation related to a selected Service Process	Individual presentation	Face-to-face	02:00	12.5%	5 / 10	CG18 CE9 CG1 CG3
14	Discussion/Participating in class	Other assessment	Face-to-face	01:00	1.5%	5 / 10	CG1 CG3 CG18 CE9

7.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
16	Final Test	Written test	Face-to-face	02:00	100%	5 / 10	CG1 CG3 CG18 CE4 CG17 CE9 CE10

7.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Final Test	Written test	Face-to-face	02:00	100%	5 / 10	CG1 CG3 CG18 CE4 CG17 CE9 CE10

7.2. Assessment criteria

The assessment activities are the following:

- Attendance and Active participation of students during the classes (15%).
- Group Exercises related to Return on Investment (ROI) in Commitment (10%), Assessment (10%), Action Plans and Implementation (10%), and Summary (5%)
- Group Exercise related to ROI in a Small enterprise (10%).
- Individual Test related to the CMMI Concepts (15%).
- Individual research work based on a service process from ITIL (25%). This activity is divided into two ones. One related to the individual skills in communications (12.5%) and the other one related to the memory of the work itself (12.5%).

Students should have a rating greater or equal than 5.0 (over 10) to pass the subject.

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Subject Moodle Site	Web resource	Students will be able to get the slides and other resources from the Moodle platform.
IDEAL	Bibliography	McFeeley, B.; IDEAL: A User's Guide for Software Process Improvement; Handbook CMU/SEI-96-HB-001; February 1996
SCAMPI	Bibliography	SCAMPI Upgrade Team; Standard CMMI® Appraisal Method for Process Improvement (SCAMPI) A, Version 1.3: Method Definition Document; Handbook CMU/SEI 2011-HB-?001; March 2011
ITIL	Bibliography	ITIL -Information Technology Infrastructure Library (Service Strategy, Service Design, Service Transition, Service Operation, Continual Service Improvement)

CMMI Model V2.0	Bibliography	CMMI Institute, CMMI V2.1 Model, December 2018