



# Challenges for accessible computing for people with functional diversity

## Learning Guide – Information for Students

### 1. Description

<b>Grade</b>	Máster Universitario en Ingeniería de Software - European Master on Software Engineering
<b>Module</b>	Advanced Software Engineering Aspects
<b>Area</b>	
<b>Subject</b>	Challenges for accessible computing for people with functional diversity
<b>Type</b>	Elective
<b>ECTS credits</b>	4
<b>Responsible department</b>	Computer Languages and Systems and Software Engineering
<b>Major/Section/</b>	

<b>Academic year</b>	2012/2013
<b>Term</b>	1 <sup>st</sup> term
<b>Language</b>	English
<b>Web site</b>	<a href="http://www.cettico.fi.upm.es/dpt/muss/indexen.html">http://www.cettico.fi.upm.es/dpt/muss/indexen.html</a>



## 2. Faculty

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## 3. Prior knowledge required to take the subject

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



## 4. Learning goals

SUBJECT-SPECIFIC COMPETENCES AND PROFICIENCY LEVEL		
Code	Competence	Level
SC13	To have a vision of the different specific and emergent aspects of the Software Engineering, and to go further in some of them.	A
SC14	To understand what nowadays software engineering procedures can and cannot reach, their limitations and their possible future evolution.	C

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



<b>SUBJECT LEARNING OUTCOMES</b>			
<b>Code</b>	<b>Learning outcome</b>	<b>Related competences</b>	<b>Proficiency level</b>
LR1	Within an application field of Software Engineering, uses and designs the appropriate solution to solve some of its problems, describing the technical difficulties and the application limits	SC13, SC 14	C
LR2	Facing a real problem, chooses an appropriate Software Engineering solution, analyzing its viability, what can and cannot be achieved from the current state of development of the selected solution, and what is expected to advance in the future	SC13, SC 14	C
LR3	Explains which are the Software Engineering limits and frontiers, and the base of new tendencies and developments and advanced topics and their possible application	SC13, SC 14	A



## 5. Subject assessment system

ACHIEVEMENT INDICATORS		
Ref	Indicator	Related to LR
I1	Describe, using appropriate terminology, assistive technologies and their interaction with ICT	LR2
I2	Describe, using appropriate terminology, the principles of design for all applied to ICT	LR1
I3	Evaluate the accessibility of an ICT product according to the requirements specified in a technical standard	LR2
I4	Propose modifications in development methodologies to integrate a user centred approach	LR3
I5	Propose modifications in an accessibility technical standard	LR3
I6	Review scientific documentation on a subject related to ICT accessibility and Present a summary of the state of the art on that same subject	LR3

CONTINUOUS ASSESSMENT			
Brief description of assessable activities	Time	Place	Weight in grade
Test 1: knowledge on assistive technologies and design for all principles	Week 4	Classroom	10%
Participation in collaborative learning sessions	Weeks 5 and 6	Classroom	10%
Exercise 1: a document containing change proposal for an accessibility standard.	Week 7	Classroom	15%
Exercise 2: an accessibility assessment of an ICT product, using the standard studied during collaborative learning.	Week 8	Classroom	15%



<b>CONTINUOUS ASSESSMENT</b>			
<b>Brief description of assessable activities</b>	<b>Time</b>	<b>Place</b>	<b>Weight in grade</b>
Exercise 3: a short proposal of changes in one ICT development methodology to integrate a user centred approach.	Week 11	Classroom	10%
Exercise 4: state of the art on one topic related to ICT accessibility. Classroom presentation.	Weeks 14 and 15	Classroom	15%
Exercise 4: state of the art on one topic related to ICT accessibility. Delivery of report.	Week 15	Classroom	15%
Test 2: knowledge on accessibility evaluation, user centred design and state of the art in ICT accessibility	Week 16	Classroom	10%
			<b>Total: 100%</b>



## GRADING CRITERIA

The assessment of this module is divided into two parts: theory and practice. Both parts have to be passed in order to pass the module. The grades obtained in theory and practice are combined as described in the continuous assessment table above.

### **Theory**

The theoretical part of the module contains two different assessments. First, there will be two test-based assessments. Second, there is going to be assessment of the performance of the collaborative learning sessions that will be part of the study of accessibility standards.

### **Practical work**

The practical work consists of 4 exercises:

- Exercise 1: a document containing change proposal for an accessibility standard.
- Exercise 2: an accessibility assessment of an ICT product, using the standard studied during collaborative learning.
- Exercise 3: a short proposal of changes in one ICT development methodology to integrate a user centred approach.
- Exercise 4: state of the art on one topic related to ICT accessibility. Students will make a short presentation in the classroom.

All the exercises are individual.

### **Assessment procedure**

The module will be assessed in a scale of 10 points, divided into 3 points for the theory and 7 points for the practical exercises. To pass the complete module it will be necessary to obtain a minimum of 1 point in theory, 3 points in the exercises and 5 points in the addition of theory and practice.

All the practical exercises are mandatory and will be graded according to the continuous assessment table above.

The dates for the publication of grades and the ulterior exam revision will be notified as part of the corresponding exam. The exam revision will be made based on prior enquiries made by the students.

In the extraordinary evaluation period (July) the theory tests will be repeated and the pending exercises can be delivered again. Neither the participation in collaborative learning nor the classroom presentation of exercise 4 will be re-assessed, so the grades received previously will be reused.



## 6. Contents and learning activities

<b>SPECIFIC CONTENTS</b>		
<b>Unit / Topic / Chapter</b>	<b>Section</b>	<b>Related indicators</b>
<b>Chapter 1: Functional diversity, accessibility and design for all.</b>	1.1 Introduction	I1
	1.2 Functional diversity	I1
	1.3 Assistive products for ICT	I1
	1.4 Design for all	I2
<b>Chapter 2: ICT accessibility standards</b>	2.1 Introduction to standards	I3, I5
	2.2 Relevant ICT accessibility standards	I3, I5
	2.3 Deeper study of one accessibility standard	I3, I5
	2.4 Conformity assessment	I3
<b>Chapter 3: User centred design</b>	3.1 Introduction to user centred design	I4
<b>Chapter 4: State of the art in ICT accessibility</b>	4.1 State of the art and future trends	I6





## 7. 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	
THEORY CLASSES	<ul style="list-style-type: none"><li>• <b>Explanation/Lecture.</b> Some traditional lectures will be made to explain the relevant concepts of the subject, with the support of audiovisual content and documents.</li><li>• <b>Cooperative Learning.</b> The jigsaw technique will be used. Students are organised into groups and each group member receives a different document that he or she will individually read. Then students who have read the same documents will share their views. Then the groups meet together and each student explains his or her document to the team. Finally all the documents are presented in the classroom by students that haven't read them.</li></ul>
PROBLEM-SOLVING CLASSES	-
PRACTICAL WORK	-
INDIVIDUAL WORK	<ul style="list-style-type: none"><li>• <b>Case studies.</b> Intensive and exhaustive analysis of a real problem related to ICT accessibility 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.</li><li>• <b>Exercises and Problem Solving.</b> Students will be asked to develop the suitable or correct solutions to problems defined by the professors.</li></ul>
GROUP WORK	...
PERSONAL TUTORING	<ul style="list-style-type: none"><li>• <b>Classroom tutoring.</b> There will be tutoring activities in the classroom, aimed at providing general guidance to the development of the practical exercises.</li><li>• <b>Individual tutoring.</b> The professors will also do individual tutoring to the students.</li></ul>



## 8. Teaching resources

<b>TEACHING RESOURCES</b>	
<b>RECOMMENDED READING</b>	Connell, B.R.; Jones, M.; Mace, R.; Mueller, J.; Mullick, A.; Ostroff, E.; Sanford, J.; Steinfeld, E.; Story, M.; Vanderheiden, G. "The Principles of Universal Design". Version 2.0. The Center for Universal. Raleigh, North Carolina State University. Abril 1997. URL: <a href="http://www.design.ncsu.edu/cud/about_ud/udprinciples.htm">http://www.design.ncsu.edu/cud/about_ud/udprinciples.htm</a>
	Krug, S.: "Don't make me think!: a Common Sense Approach to Web Usability", Second edition, New Riders, ISBN: 0321344758, 2005.
	International Organization for Standardization (ISO), International Electrotechnical Commission (IEC). ISO/IEC TR 29138-1 "Information technology -- Accessibility considerations for people with disabilities -- Part 1: User needs summary". 2009. Freely available at: <a href="http://jtc1access.org/TR29138.htm">http://jtc1access.org/TR29138.htm</a>
	Palacios, A.; Romañach, J.: "El modelo de la diversidad. La Bioética y los Derechos Humanos como herramientas para alcanzar la plena dignidad en la diversidad funcional ", Ediciones Diversitas, ISBN: 8496474402, 2007.
	SIDAR (Fundación Sidar - Acceso Universal): <a href="http://www.sidar.org">http://www.sidar.org</a> , España. 2011
<b>WEB RESOURCES</b>	Subject web site ( <a href="http://www.cettico.fi.upm.es/dpt/muss/indexen.html">http://www.cettico.fi.upm.es/dpt/muss/indexen.html</a> )
	Subject Moodle site (-)
<b>EQUIPMENT</b>	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, 1.1 and 1.2. Lecture (2 hours)	•	• Individual study (1 hour)	•	•	•
Week 2 (3 hours)	• Chapter 1, 1.3 and 1.4. Lecture (2 hours)	•	• Individual study (1 hour)	•	•	•
Week 3 (3hours)	• Chapter 2, 2.1 and 2.2. Lecture (2 hours)	•	• Individual study (1 hour)	•	•	•
Week 4 (6 hours)	•	•	• Preparation for Test 1 (4 hours)	•	• Test 1 (2 hours)	•
Week 5 (8 hours)	• Chapter 2, 2.3. Cooperative learning (2 hours)	•	• Exercise 1: analyse and comment on one standard (6 hours)	•	•	•
Week 6 (8 hours)	• Chapter 2, 2.3. Cooperative learning (2 hours)	•	• Exercise 1: analyse and comment on one standard (6 hours)	•	•	•
Week 7 (10 hours)	• Chapter 2, 2.4. Lecture (2 hours)	•	• Exercise 2: accessibility evaluation (6 hours)	•	• Deliver exercise 1 (2 hours)	•
Week 8 (10 hours)	• Chapter 3, 3.1. Lecture (2 hours)	•	• Exercise 2: accessibility evaluation (6 hours)	•	• Deliver Exercise 2 (2 hours)	•
Week 9 (8 hours)	• Classroom tutoring. Collective revision of exercise 2 (2 hours)	•	• Exercise 3. Modification proposal for a methodology (6 hours)	•	•	•



Week 10 (8 hours)	• Classroom tutoring. Exercise 3 (2 hours)	•	• Exercise 3. Modification proposal for a methodology (6 hours)	•	•	•
Week 11 (10 hours)	• Chapter 4, 4.1. Lecture (2 hours)	•	• Exercise 4. State of the art of one subject related to ICT accessibility (6 hours)	•	• Deliver Exercise 3 (2 hours)	•
Week 12 (9 hours)	• Classroom tutoring. Exercise 4 (2 hours)	•	• Exercise 4. State of the art of one subject related to ICT accessibility (7 hours)	•	•	•
Week 13 (8 hours)	• Classroom tutoring. Exercise 4 (2 hours)	•	• Exercise 4. State of the art of one subject related to ICT accessibility (6 hours)	•	•	•
Week 14 (5 hours)	• Classroom presentation of exercise 4 (2 hours)	•	• Exercise 4. Preparation of the presentation (1hour)	•	• Delivery of exercise 4 (2 hours)	•
Week 15 (3 hours)	• Classroom presentation of exercise 4 (2 hours)	•	• Exercise 4. Preparation of the presentation (1hour)	•	•	•
Week 16 (6 hours)	•	•	• Preparation for Test 2 (4 hours)	•	• Test 2 (2 hours)	•

Note: Student workload specified for each activity in hours