Ubiquitous Computing

Academic Year: (2013 / 2014)   **Review date: 14-05-2013**

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: ROMANO , MARCO

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Programming, Principles of Informatics Engineering, User Interfaces

OBJECTIVES

¿ General competencies
  o Capability to analyze and synthesize (PO b)
  o Capability to organize and plan (PO d)
  o Problem solving (PO c)
  o Teamwork (PO d)
  o Capacity to apply theoretical concepts (PO c)
¿ Specific competences
  o Cognitive (PO a)
    ¿ Knowledge of ubiquitous computing elements
    ¿ Knowledge of systems, architectures and applications for pervasive computing
    ¿ The impact of ubiquitous computing on the society
    ¿ Knowledge of ubiquitous computing design methods
  o Procedural/Instrumental (PO a, c, e, i, k)
    ¿ Developing of user interfaces for interactions in an ubiquitous environment
  o Attitudinal (PO c, d, f)
    ¿ Creativity
    ¿ Quality concerns
    ¿ Achievement motivation
    ¿ Interesting for doing research and figuring out solutions to new problems
    ¿ Communication abilities for divulging results to different audiences

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to Ubiquitous Computing
- History and Definition
- Interaction paradigms in an ubiquitous computing environment
- Devices ecology
2. Mobile technologies
- Mobile computing: introduction
- Context awareness applications
- Augmented reality techniques for mobile devices
3. Interactions in ubiquitous environments
- Multi-touch interactions
- Touchless technologies (Microsoft Kinect)
- Tangible user interfaces
- Rapid prototyping techniques aimed at ubiquitous environments
4. Future Prospects of ubiquitous computing

LEARNING ACTIVITIES AND METHODOLOGY

¿ Theoretical lectures: 1.5 ECTS (PO a)
  - Purpose: to achieve the specific cognitive competencies of the course.
  - Implementation: lectures in which theoretical concepts on ubiquitous computing are exposed.
¿ Practical lectures: 1.0 ECTS (PO a, c, e, k)
  - Purpose: to achieve the specific instrumental competences and develop attitudinal competences.
  - Implementation: labs in which technical issues related to the development of ubiquitous computing

applications are exposed.
¿ Practical case: 2.0 ECTS (PO a, c, d, e, k)
   - Purpose: to develop both instrumental and attitudinal competencies.
   - Implementation: designing and implementing a practical case within a work group.
¿ Critical analysis of research papers: 1.0 ECTS (e, d, f, g)
   - Purpose: to deepen the knowledge of specific topics of the course.
   - Implementation: Students solve programming exercises of ubiquitous computing applications.
¿ Final examination: 0.5 ECTS (PO a, c)
   - Purpose: to complete the development of specific cognitive and procedural capabilities.

ASSESSMENT SYSTEM

The evaluation system includes the assessment of guided academic activities and practical cases, with the following weights:
Practical case: 60% (PO a, c, d, e, k)
Critical analysis of research papers: 20% PO (e, d, f, g)
Examination: 20% (PO a, c)
Final examination is mandatory (minimum grade 4/10).

% end-of-term-examination:	20
% of continuous assessment (assigments, laboratory, practicals…):	80

BASIC BIBLIOGRAPHY

 - Dragan. S. Context-aware mobile and ubiquitous computing for enhanced usability : adaptive technologies and applications. , Hershey (Pennsylvania), 2009
 - Grudin, J. The Computer Reaches Out: The Historical Continuity of Interface Design, ACM, 1990

 - Krumm, J. Ubiquitous computing Fundamentals., Chapman & Hall/CRC Press , 2010

 - Weiser, M. The Computer of the 21st Century , ACM, 1997

 - Weiser, M., Brown J. S. The Coming of Age of Calm Technology , Copernicus, 1997

ADDITIONAL BIBLIOGRAPHY

 - Bradski, Gary Learning OpenCV: Computer Vision with the OpenCV Library, O'Reilly Media, 2008

 - Greenberg, Ira Processing : creative coding and computational art, friendsofED, 2007

 - Grudin, J. The Computer Reaches Out: The Historical Continuity of Interface Design, ACM, 1990

 - Lott, Joey; Schall, Darron; Peters, Keith ActionScript 3.0 Cookbook : Solutions for Flash Platform and Flex Application Developers: Solutions for Flash Platform and Flex Application Developers, O'Reilly, 2006
 - Upadhyaya, S., Chaudhury, A., Kwiat, K., Wiser, M. Mobile Computing: Implementing Pervasive Information and Communications Technologies, Springer, 2002
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 - Weiser, M., Brown J. S. The Coming of Age of Calm Technology , Copernicus, 1997

 - Zigurd Mednieks; Laird Dornin; G. Blake Meike; Masumi Nakamura Programming Android, 2nd Edition, O'Reilly Media, 2012