Course guide
340625 - TEIN-R3P01 - Internet Technologies

Unit in charge:	Vilanova i la Geltrú School of Engineering
Teaching unit:	701 - DAC - Department of Computer Architecture.

Degree: MASTER'S DEGREE IN AUTOMATIC SYSTEMS AND INDUSTRIAL ELECTRONICS (Syllabus 2012). (Optional subject).

Academic year: 2023   **ECTS Credits:** 5.0   **Languages:** Catalan, Spanish, English

LECTURER

Coordinating lecturer: Xavier Masip Bruin

Others: Xavier Masip Bruin

PRIOR SKILLS

Basic knowledge in networking and IT

REQUIREMENTS

No requisits required

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
4. CB10 - Skills that enable to continue studying in a way that should be self-directed and autonomous
5. CB6 - Having the knowledge and understanding to provide a basis or opportunity for originality in developing and / or applying ideas, sometimes in a research context
6. CB7 - Students can apply their knowledge and their ability to solve problems in new or
unfamiliar contexts within broader (or multidisciplinary) contexts related to their field of study
7. CB9 - Students can communicate their conclusions, knowledge and rationale underpinning these, to skilled and unskilled public in a clear and unambiguous way
8. CC01 - Ability to research, design, develop and characterize advanced control systems that enable the dynamic system behave according to the operational performance requirements.

Transversal:
1. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.
2. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.

TEACHING METHODOLOGY

The course will run under an interactive and collaborative methodology, including four key areas:
- Theoretical sessions given by the professor
- Interactive sessions where students present topics and concepts related to applying ICT to the industrial sector
- Discussion sessions where students defend key aspects on the technology evolutiontecnologia
- Lab sessions where students will practice with generic electronic stuff (Arduino, Rasp)
There is no mark to be re-evaluated.

LEARNING OBJECTIVES OF THE SUBJECT

Improve knowledge on networking aspects with a clear focus on both, solidifying basic networking concepts and introducing new research trends dealing with current Internet weaknesses. The knowledge introduced in the last theoretical sessions is industrial-oriented, aimed at showing how new technologies may contribute to substantially improve monitoring processes and equipment automatization.

STUDY LOAD

Type	Hours	Percentage
Hours small group	15,0	11.11
Self study	90,0	66.67
Hours large group	30,0	22.22

Total learning time: 135 h

CONTENTS

1. Internet: Weaknesses and limitations

Description:
Clear and deep decription of the current state-of-the-art in Internet, with an strong effort in showing the impact in the industrial sector. First, in this section the student will get in a general view the main set of limitations of internet, emphasizing the main issues and concepts both potentially limiting the scope of Internet, so giving the proper support to the evolution envisioned for the services to be offered to the final user. Second, the student will browse into the specific limitations for smart scenarios, focusing on different sector (city, transportation, industry, health), also showing the way these limitations may hinder the deployment of new services in these domains. Finally, in this section we will propose to categorize the different probles and weaknesses into areas, so making it easy the deployment of advanced solutions

Specific objectives:
Provide knowledge enough about the set of reasons limiting the deployment of new services and apps, so paving the path to find out strategies to overcome the undesirable effects

Related activities:
Oral presentation focused on a specific thematic area, strongly linked to the main subject concepts, where current Inet limitations may be clearly shown.

Full-or-part-time: 10h
Theory classes: 10h

2. Strategies for distributed smartness

Description:
Definition of cloud, fog, and the different systems and devices enabling a suitable and efficient distribution of the overall smartness from the edge device up to the traditional cloud
Resources management
Existing problems and research trends

Specific objectives:
Introduce the student to distributed systems concepts, particularly into those emphasizing the decoupling of processing tasks at cloud or fog premises. Analyze applicability scenarios oriented to smart scenarios, enabling students to identify main demands to define potential services to be implemented for individual scenarios and being aware of identifying demands coming from both the final client and the current and future technology.

Related activities:
Lab sessions
Discussion session

Full-or-part-time: 8h
Theory classes: 8h

3. Testing on emulated scenario

Description:
Showing the problems and issues identified at lab premises, through a smart city scenario, where students may deploy services in different sectors, also showing technology limitations and enabling the deployment of new solutions through an interactive approach.

Specific objectives:
Showing issues and limitations of current technology in a close-to-reality scenario, thus enabling the student to interact with the system as well as the to deploy potential solutions.

Related activities:
Lab session

Full-or-part-time: 15h
Theory classes: 15h

4. New business models

Description:
Introduce the student to the potentially new business models leveraging TIC evolution in smart systems with special attention to the industrial sector, though open to distinct domains. Recognized the fact that flagship ICT technologies in distributed processing along with new computation paradigms and new communication technologies, are all focused on easing the execution of the different jobs and tasks in an smart context, be it purely industrial (industry 4.0) o closer-to-the-user sectors (AR/VR, smart cities, e-health, smart transportation, etc.). Thus, it is mandatory to know how these new models (recently leveraging the "openness" concept) may turn into tuning the current business models and vice-versa.

Specific objectives:
Getting a good knowledge about the impact technology evolution may have in the pop up of new services and how they may easy the deployment of new models business. Moreover, it is also an objective for this section to getting solid knowledge about market relation-ships in the ICT sector, in order to be perfectly aware about existing limitations that may hinder potential deployments.

Related activities:
Discussion session

Full-or-part-time: 4h
Theory classes: 4h

GRADING SYSTEM

Final mark computed as::
FINAL MARK = 0,4 x (Oral presentation) + 0,30 x (lab) + 0,3 x (discussion session)

RESOURCES

Other resources:
Lab sessions support