

30242 - Warantee and Security

Syllabus Information

Academic year: 2023/24

Subject: 30242 - Warantee and Security

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 439 - Bachelor's Degree in Informatics Engineering

ECTS: 6.0

Year: 4

Semester: Second semester

Subject type:

Module:

1. General information

This subject provides knowledge and practice on how to ensure the operation of critical systems and services from the perspective and action of the most hardware-related levels. Among the objectives of this subject:

- Understand the concept of high availability and the techniques and methodologies associated with it at multiple system levels: processor, memory, peripherals, operating system, execution environments, and applications and services.
- Know techniques related to fault tolerance and preventive diagnosis.
- Demonstrate knowledge of virtualization, including the implementation of hypervisors and interpreters, as well as its implications for IT security implications.

These approaches and objectives are aligned with targets 7.3, 8.2 and 9.5 of the sustainable development goals SDGs of agenda 2023.

It is recommended to have previously taken Computer Architecture and Organization I and 2, Operating Systems, Computer Networks and Systems Administration.

2. Learning results

Understand the concept of high availability and its implications on system components: electronics and cabling, processors, memories, I/O, microprograms and Operating System, know specific techniques related to reliability, fault tolerance and preventive diagnostics.

Know the task of the system administrator with regard to high availability. Understand the protection mechanisms and security of the Operating System and knows how to use them to configure services, user identification and security policies.

Understand the concept of Virtual Machine (VM), its types and applications. Be able to install, configure and monitor MVs and evaluate their performance in different scenarios. Know specific products and is able to use them in security, migration and consolidation applications.

3. Syllabus

- Fundamentals of virtualization and mission-critical support and RAS (Reliability, Availability and Serviceability) Taxonomy of hypervisors
- Implementation mechanisms for system virtualization: interpreters, trap&emulate, paravirtualization Architectural support to virtualization with case studies: AMD64, ARMv8, RISC-V, ..
- Memory and peripheral virtualization
- Mechanisms to ensure reliability, fault tolerance and security of processors, memory and I/O in virtualized environments.
- Examples of virtualization products: IBM Z series, KVM, Xen, Amazon Nitro, ..
- Systems architecture: e-mail and web

4. Academic activities

- Lectures: The main aspects of each concept will be presented and the readings to be read will also be introduced
- Problem solving classes: Problems related to the syllabus will be solved and these classes will be interspersed with the lectures.
- Assisted laboratory practices: Applications and services of the subject will be implemented, installed and/or administered.
- Practical work: Work on specific topics may be proposed in which students will work both with their own documentation and with the sources offered in the subject.
- Study and personal work: Students will spend time acquiring the necessary knowledge and skills to achieve the learning results
- Corrections and examinations: Students will be able to submit their work and activities to receive feedback on their progress in addition to being evaluated.

5. Assessment system

The assessment will consist of three parts:

- Exercises on theoretical and practical contents (30%). These exercises correspond to problems and articles presented in class and must be handed in on a regular basis.
- Practices (30%). Students will defend the work done orally with accompanying material such as memories on dates to be established well in advance.
- Exam (40%). There will be a test composed of a combination of problems, open-ended questions, multiple-choice questions and exercises similar to those seen in class.

The subject is passed with an overall grade of 5 points out of 10, with a minimum of 4 points out of 10 in each of the two parts. In case of not reaching the minimum grade in any of the parts, the maximum global grade will be 4.5 points out of 10.

It will be possible to opt for a global test that will consist of the 3 parts of the assessment (exercises, practices and exam) and it will represent 100% of the grade.