340382 - ADSO-I5001 - Operating Systems Administration

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering
Teaching unit: 701 - AC - Department of Computer Architecture
Academic year: 2018
Degree: BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish, English

Teaching staff
Coordinator: Sergi Sánchez López

Prior skills

Requirements

Degree competences to which the subject contributes

Specific:
3. CETI2. Ability to select, design, develop, integrate, value, construct, tmanage, exploit and maintain technologies of machines, programming and nets, keeping suitable costs and quality parameters.
4. CETI3. Ability to set up methodologies focused on user and development organization, valuation and application management and systems based on information technologies which secure ergonomic accessibility and use of
5. CETI5. Ability to select, to develop, integrate and manage information systems which satisfy organization necessities with indentified costs and quality criteria.

Transversal:
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.
2. EFFECTIVE USE OF INFORMATION RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

Teaching methodology

Classes will be held using the means available in the classroom (blackboard, multimedia equipment) and those provided by the students themselves (laptop) and will be based on the learning project. The class will be organized in teams of 5-6 students who, applying agile methodologies, develop a project throughout the course. The objectives of this project will be directly related with the contents of the subject. To work as a team, class attendance is COMPULSORY. A portion of the mark will be the defense, by each team, the objectives achieved at each moment, and teamwork. The other part of the mark will be based on the realization of individual exam, partial and final.

Learning objectives of the subject

1. Knowledge about the system administrator, with his/her responsibilities and tasks.
2. Plan the basic installation of the systems in an organization.
3. Learn to prepare an installation of the operating system, perform the installation, and the post-installation.
4. Learn to install, maintain, and manage applications for the organization.
4. Manage user accounts, add users, modify users, get information on users, deactivate users, and remove users.
5. Use and modify the permissions and protection mechanisms offered by the operating systems on devices and files.
7. Learn to monitor the operating system, users, resources, and applications.
8. Learn to maintain the resources and the file system in a good condition, and to perform backups.
9. Manage the system services, and periodic tasks
10. Learn to configure the main Internet services.
11. Configure, verify and maintain the security of the installation.

<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours large group:</th>
<th>45h</th>
<th>30.00%</th>
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<tbody>
<tr>
<td>Total learning time: 150h</td>
<td>Hours medium group:</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>15h</td>
<td>10.00%</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
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</tbody>
</table>
## Presentation

**Learning time:** 1h  
Theory classes: 1h

### Description:
- 0.1 Information ADSO  
- 0.2 teachers  
- 0.3 Course objectives  
- 0.4 Teaching methods  
- 0.5 evaluation  
- 0.6 Agenda  
- 0.7 Planning of the semester

## Introduction

**Learning time:** 8h  
Theory classes: 1h  
Laboratory classes: 1h  
Self study: 6h

### Description:
- 1.1. definitions  
- 1.2 Parts Operating System  
- 1.3 System Administrator Tasks  
- 1.4 Skill level  
- 1.5 Administrator ethical code
### Installation of the operating system

**Description:**
- 2.1 Lifecycle of a system
- 2.2 Prerequisite Tasks: information and planning
- 2.3 Physical Structure of a disc
- 2.4 Partitions: concept and justification
- 2.5 Structure of the file system (UNIX and Windows)
- 2.6 swap area
- 2.7 Creating the filesystem
- 2.8 System Load
- 2.9 Basic System Configuration
- 2.10 Starting the system
- 2.11 System Shutdown

**Related activities:**
- Activity 1: Problems installing an operating system
- Lab: Installing an operating system

**Learning time:** 17h
- Theory classes: 2h
- Practical classes: 6h
- Laboratory classes: 1h
- Self study: 8h

### User Management

**Description:**
- 3.1 The user as a protection domain
- 3.2 System Databases
- 3.3 Basic Commands
- 3.4 Deactivating and deleting users
- 3.5 Users and Processes
- 3.6 permissions and protections
- 3.7 Users and special groups
- 3.8 User Management Policies

**Related activities:**
- Activity 1: user management exercises
- Activity 2: User Management Laboratory
- Activity 3: complementary Work about user management

**Learning time:** 16h
- Theory classes: 1h
- Practical classes: 4h
- Laboratory classes: 1h
- Guided activities: 2h
- Self study: 8h
### Application Management

**Description:**
4.1 Installing applications
4.2 Versioning
4.3 Installing from source code

**Related activities:**
Activity 1: Application Management Exercises
Activity 2: Application management Laboratory
Activity 3: scripts Programming Laboratory

**Learning time:** 12h
- Theory classes: 1h
- Practical classes: 2h
- Laboratory classes: 1h
- Self study: 8h

### Monitoring

**Description:**
5.1 Objectives
5.2 Justification
5.3 Components for monitoring
5.3.1 CPU
5.3.2 Memory
5.3.3 Disk
5.3.4 Network
5.3.5 Users
5.4 Processes
5.4.1 Process Management
5.4.2 Communication between processes

**Related activities:**
Activity 1: system monitoring exercises

**Learning time:** 10h
- Theory classes: 1h
- Laboratory classes: 1h
- Self study: 8h
### File System Maintenance

**Description:**
- 6.1 Internal organization filesystem
- 6.2 Owners and protections
- 6.3 File System Integrity
- 6.4 Backups

**Related activities:**
- Activity 1: filesystem Exercises
- Activity 2: Laboratory of timing
- Activity 3: filesystem complementary work

**Learning time:** 17h
- Theory classes: 2h
- Practical classes: 4h
- Laboratory classes: 1h
- Guided activities: 2h
- Self study: 8h

### Local Services management

**Description:**
- 7.1 Objectives
- 7.2 Task Timing
- 7.3 Print Services

**Related activities:**
- Activity 1: Local services lab

**Learning time:** 10h
- Theory classes: 1h
- Laboratory classes: 1h
- Self study: 8h
### Network services management

**Description:**
- 10.1 Transportation
- 10.2 Protocols
- 10.3 Networks and hosts
- 10.4 Address Management
- 10.5 ports
- 10.6 Firewalls
- 10.7 Server and Superserver
- 10.8 RPC
- 10.9 DNS, DHCP, HTTP, FTP, SMTP, POP, IMAP, SSH, NFS, SMB, LDAP, VPN

**Related activities:**
- Activity 1: Network services exercises
- Activity 2: DNS lab

**Learning time:** 10h
- Theory classes: 1h
- Practical classes: 2h
- Laboratory classes: 1h
- Self study: 6h

### Protection and Security

**Description:**
- 11.1 goals
- 11.2 definition
- 11.3 Default security
- 11.4 Security and Usability
- 11.5 Safety Components
- 11.6 physical security
- 11.7 Local Security
- 11.8 Network Security

**Related activities:**
- Activity 1: protection and security exercises
- Activity 2: backup lab

**Learning time:** 14h
- Theory classes: 1h
- Practical classes: 4h
- Laboratory classes: 1h
- Self study: 8h
Virtualisation

<table>
<thead>
<tr>
<th>Learning time: 13h</th>
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<tbody>
<tr>
<td>Theory classes: 1h</td>
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<tr>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td>Laboratory classes: 2h</td>
</tr>
<tr>
<td>Self study: 8h</td>
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</tbody>
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**Description:**
- 9.1. Habits and customs
- 9.2. Emulation and simulation
- 9.3. Virtualisation and operating system
- 9.4. Xen
- 9.5. KVM

**Related activities:**
- Activity 1: virtualization exercises
- Activity 2: virtualization lab

Qualification system

mid-term exam*0.3 + project*0.3 + Final exam*0.4 + tests*0.1 >= 5

Revaluation: exam

Regulations for carrying out activities

To obtain the project mark and tests, the class attendance is compulsory

Bibliography

**Basic:**


**Complementary:**