34021 - ASORC (2022-23)

Subject Context

This subject is the second one in the sequence of “Operating Systems”.
It is in between of “Fundamentals of Operating Systems” and “Distributed Operating Systems”.
The main aim of the course is to introduce students in operating systems administration and their deployment in computer networks from a horizontal approach and applied to a wide range (set) of systems.

Specific objectives provided by the faculty

Knowledge-oriented objectives:

- Meet a wide range of Current Operating Systems.
- Know, from a functional view, services offered on them.
- Dominate the deployment of systems into computers networks.
- Identify the services associated or encapsulated in each operating system for commissioning services integrals.
- Know the tools offered by the different systems for monitoring services, performance and hardware.
- Know the tools needed to running systems in virtual environments.

1. Specific
   - Know how to install a significant sample of the operating systems that are available today, both proprietary and open source.
   - Identify functional objectives of this sample: Servers and Desktops
   - The student should be able to describe, use and run basic services that most of the OS have.
   - The student must acquire a functional perspective of current OS.
   - The student should be able to use the emulation, virtualization and para-virtualization main tools as mechanisms for testing and evaluation prior to integrating them into production.

2. Transversal
   - Ability to organize and plan work groups
   - Ability to work in team
   - Oral presentation with supports audio-visual works

Content:

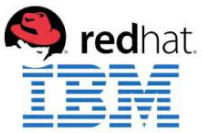
Item 1. Introduction
Contextualization and Abstractions
Internal structure and organization of Operating Systems
Organization Computer Networks

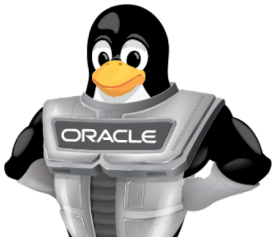
Item 2. Desktop Operating Systems
Application context and development practices:
Installation, implementation and evaluation of desktop operating systems (Include a sample of the operating systems of the following families: Windows, BSD, Red-Hat, Debian, Slackware, Solaris, etc.).
In particular it will be discussed:

• Windows Family

- Windows Server
- Window Live CD based in WinPE (Win. Pre-Installation Environment)

• Red-Hat Family

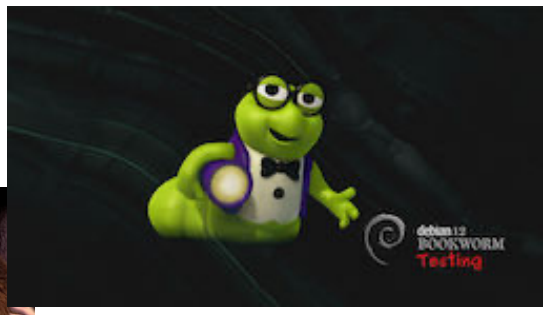




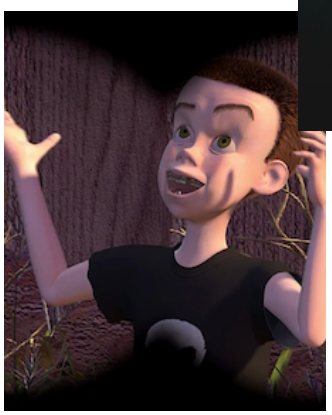
- Fedora
- Alma / Rocky (CentOS/Scientific Linux)
- Live CD

• Slackware Family
- Slackware
- Slax
- Zenwalk
- Live CD

• Debian Family (Toy Story)
- Ubuntu Linux
- Debian Stable 11 (**Bullseye)**



- Debian Testing (Bookworm)



- Debian Inestable (Sid)
- LiveCD Knoppix

- BSD Family (FreeBSD-NetBSD-OpenBSD)
  - FreeBSD
  - PC-BSD
  - LiveCD

- Solaris Family
  - OpenIndiana
  - Solaris/OpenSolaris
  - NexentaOS
  - LiveCD Belenix

- Mandriva Family
  - Mandriva
  - PCLinuxOS

- Other Families
  - Gentoo
  - Linux From Scratch (LFS)
  - OpenSuse
  - Macos (ihackintosh-ideneb-iATKOS7.1)

- Linux_at_Spain
  - GNULinEx (Extremadura)
  - Guadalinex (Andalucía - Ubuntu)
  - Molinux (Castilla La Mancha - Ubuntu)
  - Lliurex (Comunidad Valenciana - Edubuntu)

Item 3. Basic Services
Presentation
Installation and Basic Configuration
Computer Networking
Application context and development practices:
Basic services on servers (Windows Server, Rocky, FreeBSD, Debian, Solaris).
In particular, it will be discussed:

- Licensing
- Partitioning
- Starting and stopping servicess
- Remote administration:
  - ssh, sftp, scp (access by user and by public / private key)
  - vnc
  - Terminal Services (administration, user mode and console mode)
- Directory server (Active Directory, OpenLDAP, Fedora Directory Server)
- User management: Local, NIS, LDAP
- DNS service (static and dynamic, as dyndns)
- DHCP service (assignment by MAC)
- File server:
  - NFS
  - SAMBA/SMB (LDAP)
  - ISCSI
- BD server: Mysql, PosgreSQL, Oracle express. (obtain data through http)
- Web server (2 virtual domains)
- Print server
- Proxmox + iSCSI
- Git + OwnCloud (local desktop client for each app)

Item 4. Advanced Services
Presentation
Installation and Basic Configuration
Computer Networking
Application context and development practices:
Advanced services on servers (Windows Server, Rocky, FreeBSD, Debian, Solaris).

In particular, it will be discussed:

- Management of remote installations
- Terminal server: LTSP , PXE, DRBL
- Mail server (Dovecot, Postfix+MySQL+amavis+spamassassin, sendmail+ clamav+MailScanner+spamasasin, Merak, WebMail)
- FTP server (Serv-U, vsftp, proftpd)
- Instant Messaging (Jabber)
- RAID: (at installation time, at running time – RAID Administration -Replacing a disk)
- Encrypted LVM
- Backup (absolute, incremental and synchronization, AMANDA, RSINC, etc.)
- Groupware Server (Zimbra, Open-Xchange, OpenGroupware, Microsoft Exchange, ...)
- Proxy Cache (Squid): Restricting content, pages, users, LDAP authentication.
- Rutado, Firewall y VPN
- Monitoring services (Nagios)

Bibliography:

LPIC2: Study Guide
http://gaudi.ua.es
https://www.amazon.es/LPIC-2-Professional-Institute-Certification-English-ebook/dp/B01M1LSKHP/ref=sr_1_3?dchild=1&keywords=lpic2&qid=1600113089&sr=8-3

Configuración de Servidores con GNU/Linux
http://www.alcancelibre.org

https://www.server-world.info/en/note?os=Debian_10&p=dns&f=1
osboxes es donde están todas las imágenes para virtualbox.

Instruments and Evaluation criteria

Mandatory to attend practice classes (80% - BOUA 9/12/2015 art. 4 apartado 5)

Continuous assessment:

For this reason, it will be required to pass separately the set of practices that will be defended individually in laboratory hours on an agreed date. Prior to that date, the evaluation criteria and requirements for each activity will be published on the virtual campus.

The project/block A will consist of evaluation activities in which a different operating system will be reviewed. It will mean 20% of the final grade as described in the evaluation criteria and a minimum of 4 points will be required to be able to weigh.

Projects B and C will have three different evaluation blocks each, corresponding to clearly differentiated blocks on a different operating system: Linux, Unix and Windows. Each block will consist, in turn, of 11 evaluation activities that will be carried out on different services. The weighting of each block is described in the evaluation criteria and a minimum grade of 4 points will be required in each of the blocks.

In each evaluation activity, it will be assessed: the development of the same in class, the evolution of the activity and the requirements demanded in the evaluation criteria.

In case of not obtaining the minimum grade in one or more of the blocks of the same project, the last week of class can be recovered (all the blocks to be recovered will be from the same project), being able to opt for a maximum of 5 points in each of the blocks of that project for being out of time.

In case of failure, for the July and December calls, all the practices will be presented, and an exam will be carried out. In this sense, it will be necessary to present at least 10 days before the date of the exam all the practices in a folder that contains the printed index, the student's data (including their email) and a CD/DVD/USB with the complete practices. The weighting of the practices will be the same as during the course according to the evaluation criteria described. To average, the minimum score of 4 points must be reached in each of the blocks.

The practice note will account for 50% of the final grade. The exam will account for the other 50% of the grade. In the exam note it will be necessary to reach 4 points to average.

A	It will be valued: Operating System deployment in virtualized environment Correct network configuration Package management	20
B1. Linux Operating System:	Once basic services are deployed, It will be valued: Basic deployment and operation of each service Ability to interact with services	16
B2. Unix Operating System	Once basic services are deployed, It will be valued: Basic deployment and operation of each service Ability to interact with services	16
B3.Windows Operating System	Once basic services are deployed, It will be valued: Basic deployment and operation of each service Ability to interact with services	8
B1. Linux Operating System	Once Advanced services are deployed, It will be valued: Installation and basic configuration of services Monitoring of services Ability to modify the behavior of services	16
B2. Unix Operating System	Once Advanced services are deployed, It will be valued: Installation and basic configuration of services Monitoring of services Ability to modify the behavior of services	16
B3.Windows Operating System:	Once Advanced services are deployed, It will be valued: Installation and basic configuration of services Monitoring of services Ability to modify the behavior of services	8

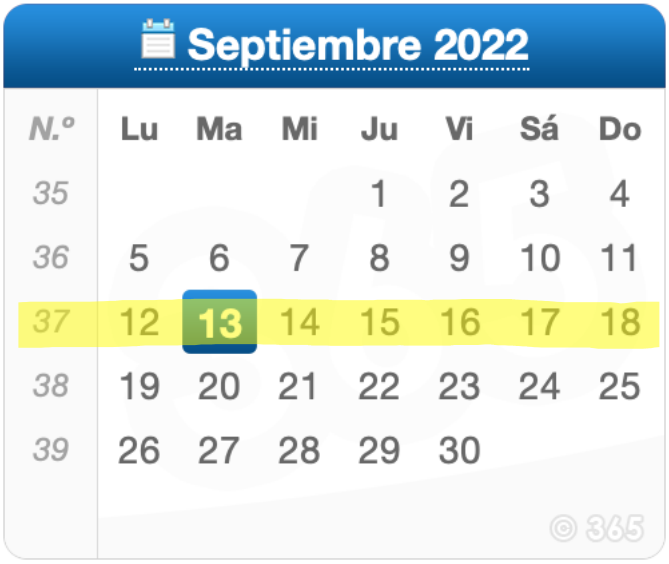
Práctica A: Oct, semana del 17

Práctica B: Nov, semana del 14

Práctica C: Dic, semana del 12

Recuperación: Semana del 21

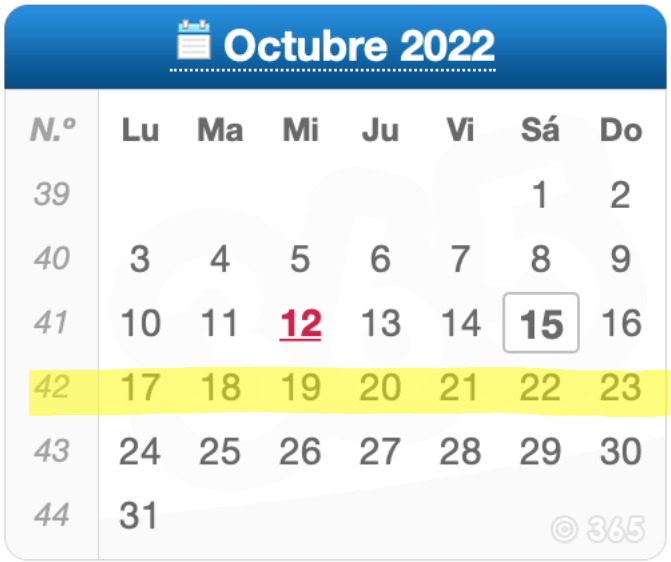
Start date: on week 38 (Sep 12th)



Project delivery:
It must deliver a consistent memory in a folder with printed index and a CD / DVD / USB with the content of each of the sections:

Practice A: (Delivery on week 42 - Oct 17th)

- Blocks:
  - A: with all desktop operating systems
- Practical functionality of different operating systems installed individually
- Proper handling of package management of each system.
- PA >= 4 to final average



Practice B: (Delivery on week 46 - Nov 14th)

- Blocks:
  - B1: Linux (16%)
  - B2: Unix (16%)
  - B3: Windows (8%)
- Functionality of the different operating systems services proposed
- Proper handling of management services for each of them
- It should solve some modifications on the behaviour of such services at the request of the teacher
- PB = (Linux * 0.4) + (Unix * 0.4) + (Windows * 0.2)
- PB >= 4 to final average
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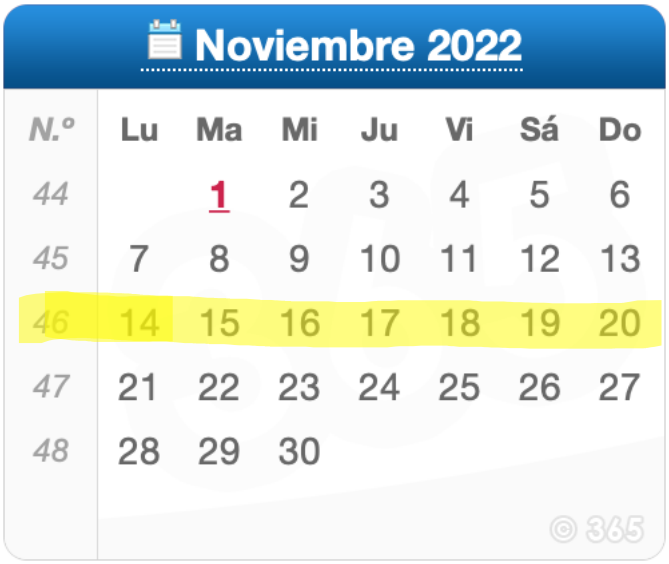
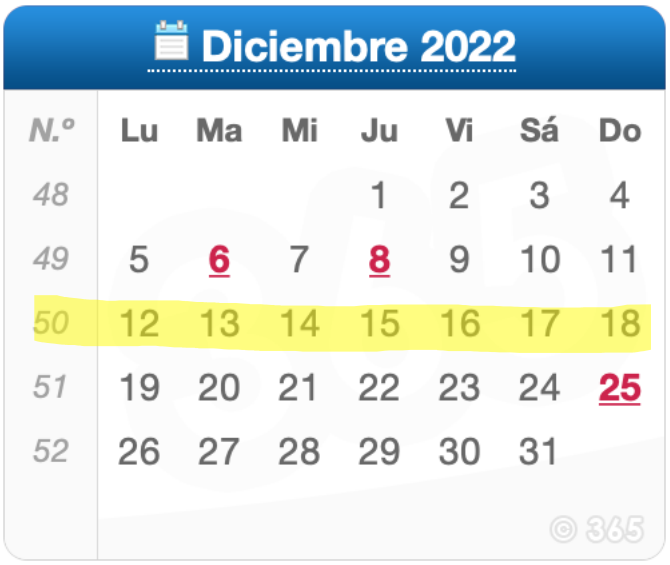


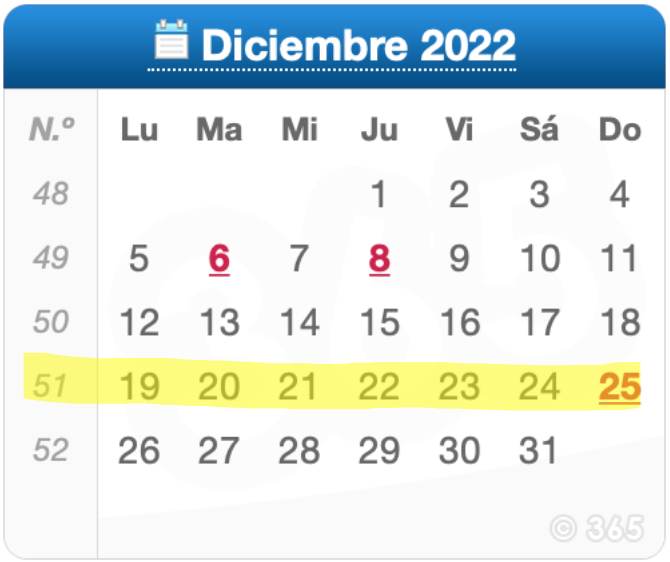
Practice C: (Delivery on week 50 - Dec 12th)

- Blocks:
  - C1: Linux (16%)
  - C2: Unix (16%)
  - C3: Windows (8%)
- Functionality of the operating systems services installed in an individually way
- Operating system services monitoring.
- It should solve some modifications on the behaviour of such services or monitoring them at the request of the teacher
- 0.8 points per item
- PC = (Linux * 0.4) + (Unix * 0.4) + (Windows * 0.2)
- PC >= 4 to final average



Recovery: on Dec, last practices day.

- Only one practice is allowed.
- 0.8 points per item
- Maximum score = 5 points (out of time).



Professor will generate score of this section based on the documentation submitted and individual demonstration of each student:

Final score = (PA * 0.2) + (B1 * 0.16) + (B2 * 0.16) + (B3 * 0.08)
+ (C1 * 0.16) + (C2 * 0.16) + (C3 * 0.08)

Final score >= 5 to pass

Other convocations (C4):

At least 10 days before the test date you have to present, all the practices in a folder that contains the printed index, student data (including your email) and a CD / DVD / USB with full practices

The practice note will account for 50% of the final grade. The exam will account for the other 50% of the grade. In the exam note it will be necessary to reach 4 points to average

After the exam, everybody with mark above 4 points will be call to attend practices review.