Fundamentos de los Sistemas Operativos (FSO)

Departamento de Informática de Sistemas y Computadoras (DISCA)
Universitat Politècnica de València

Syllabus

2018-2019

fSO

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

DISCA

General description

- **Fundamentos de Sistemas Operativos (FSO)**
  - Credits: 6,0
  - Qualification: 156-**Grado en Ingeniería Informática**
  - Module: 2-COMPULSORY SUBJECTS
  - Subject: 17-SISTEMAS OPERATIVOS
  - Semester: 3rd (2A)
- Centre: **Escuela Técnica Superior de Ingeniería Informática (ETSINF)**
  - Departament d'Informàtica de Sistemes i Computadors (DISCA)

Objetives

- To **study** the **basic concepts, fundamental techniques, and organization** of Operating Systems (OS)
  - To **understand** the **different policies** that guide the implementation of an OS
- To **know the services provided** by an OS
  - To develop programs using **system calls**
- **To acquire skills** at **advanced OS user** level
  - Dealing with the **UNIX shell** and shell programming

Teaching team

	Group	Office	e-mail
Silvia Terrasa	2A	1G.3N-17	sterrasa@disca.upv.es
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(*) Coordinator

Schedule

Teoría/teoria/Theory

	M/Dt/T	X/Dc/W		J/Dj/Th		V/Dv/F	
8:00	Grupo 2E						
8:30	Aula 1.E, 1.0			Grupo 2B		Grupo 2D	
9:00	A. Gonzalez			Aula 1G-1.5		Aula -1G-1.4	
9:30	Grupo 2A	Grupo 2C		Perez/Buen	GIA	V. Atienza	
10:00	Aula 1G-1.0	Aula -1G-1.2			Aula 1G-0.7		
10:30	S. Terrasa	G. Andreu			E.Hernandez		
11:00							
11:30	Grupo 2B	Grupo 2D				GIA	Grupo 2C
12:00	Aula 1G-1.5	Aula -1G-1.4				Aula 1G-0.7	Aula -1G-1.2
12:30	Perez/Buendia	V. Atienza	Grupo 2E			E.Hernandez	G. Andreu
13:00			Aula 1.E, 1.0			Grupo 2A	
13:30			A. Gonzalez			Aula 1G-1.0	
14:00						S. Terrasa	
14:30							
15:00							
15:30							
16:00							
16:30		Grupo 2F					
17:00		Aula 1G-0.1					
17:30		J. Pons				Grupo 2F	
18:00						Aula 1G-0.1	
18:30	Grupo 2G			Grupo 2G		J. Pons	
19:00	Aula 1G-0.3			Aula 1G-0.3			
19:30	M.A. Pinar			M.A. Pinar			
20:00							

Prácticas/Pràctiques/Lab

	L/Dl/M		M/Dt/T	X/Dc/W		J/Dj/Th	V/Dv/F
8:00			L1-GIA	L2- 2C			
8:30			Lab SISOP	Lab SISOP			
9:00			E.Hernandez	G. Andreu			
9:30			L1- 2C				L2-2A
10:00			Lab SISOP				Lab SISOP
10:30			G. Andreu				M. Agustí
11:00							
11:30			L1- 2D				
12:00			Lab TCO				
12:30			V. Atienza				
13:00			L2-GIA				L1- 2E
13:30			lab SISOP	L2- 2D			Lab TCO
14:00			E.Hernandez	Lab TCO			A. Gonzalez
14:30				G. Andreu			
15:00	L2 2F	L2 2G		L2 2G	L1-2A	Grupo 2B	
15:30	Lab SISOP	Lab TCO		Lab TCO	Lab SISOP	Lab SISOP	
16:00	J. Pons	M.A. Pinar		M.A. Pinar	S. Terrasa	F. Buendia	
16:30						L1- 2B	
17:00						Lab SISOP	
17:30						M. Agustí	
18:00							
18:30				L1- 2F			
19:00				Lab SISOP			
19:30				J. Pons			

Units and seminars

Parts	Units	Seminars
Introduction	UT00: Syllabus UT01: Operating System Concept UT02: System Calls	- SUT01: C language SUT02: UNIX shell
Process management	UT03: Process Concept and Implementation UT04: Scheduling Policies UT05: Threads UT06: Synchronization: Basic Solutions	SUT03: Process System Calls SUT04: Process Scheduling Exercises SUT05: POSIX Threads Programming SUT06: Synchronization: POSIX semaphores
Memory management	UT07: Memory Management UT08: Sparse Allocation UT09: Virtual Memory (I) UT10: Virtual Memory (II)	SUT07: Memory Map of a Linux Process SUT08: Contiguous and Sparse Allocation Exercises SUT09: Virtual Memory Exercises I SUT10: Virtual Memory Exercises II
File systems and I/O	UT11: File System Implementation UT12: Directories and Protection	SUT11: POSIX File System Calls SUT12: MINIX File System

Lab sessions (1/3)

- Content

PL01	C programming (I)
PL02	C programming (II)
PL03	Linux process monitoring
PL04	UNIX process creation
PL05	Creating POSIX threads
PL06	Synchronizing POSIX threads
PL07	Memory maps in Linux
PL08	UNIX file system calls
PL09	Visualizing the Minix file system

Operating system on the Lab → Linux Kubuntu 18.04 LTS 64-bit

Lab sessions (2/3)

- Organization
  - Lab evaluation will be done in two ways:
    - Lab 1 - 5. PoliformaT exam (55% lab grade contribution)

    80% LAB ATTENDANCE IS REQUIRED
    - Lab 6 - 9. Supervising lab work (45% lab grade contribution)
  - Attendance control will be done in the following way:
    - By the teacher 10 minutes after lab starting time
    - Short PoliformaT control at the end of the lab session
  - It is recommended to create a folder for every lab session on your HOME directory

    In case of sharing the lab PC please remember to do a copy of the lab files at the end of every session

Lab sessions (3/3)

- Remote access
  - The HOME directory on server: **shell-fso.disca.upv.es**
  - This server is accesible through SSH:
    - **Windows systems**: MobaXterm free version

    http://mobaxterm.mobatek.net/download-home-edition.html
    - **Linux and MacOSX system**: Command "ssh"

    `$ ssh user@shell-fso.disca.upv.es`
  - The user and password of ALUMNO domain will be used
- Working with virtual machine
  - Poliformat of FSO provides a virtual machine of Kubuntu 18.04 LTS for VirtualBox and the installation guide
    - →"`Recursos/Material complementario/Software/ Kubuntu 18.04 LTS 64 bit.zip link to Kubuntu 18.04 virtual machine`"

- FSO is control point for soft skill:

  COMPREHENSION AND INTEGRATION

  – This soft skill will be evaluated together with the lab work

	Prácticas / Pràctiques / Lab										
						M/Dt/T - V/Dv/F	M/Dt/T - J/Dj/Th	X/Dc/W - V/Dv/F	M/Dt/T - X/Dc/W	J/Dj/Th - V/Dv/F	
Septiembre / Setembre / Septembre					PRACTICAS	Grupos	Grupos	Grupos	Grupo	Grupo	Seminario
L/Dl/M	M/Dt/T	X/Dc/W	J/Dj/Th	V/Dv/F		A	B, G	C , D, F	E	ADE	a Practicar
			1	2							
3	4	5	6	7		S1	S1	S1/U1	S1	S1/U1	
10	11	12	13	14	PL1	U1/U2	U2/U1	U2/S2	U1/U2	U2/S2	S1
17	18	19	20	21	PL2	S2/U3	S2/U3	U3/S3	S2/U3	U3/S3	S1
24	25	26	27	28	PL3	S3/U4	S3/U4	U4/S4	S3/U4	U4/S4	S2
Octubre / October											
L/Dl/M	M/Dt/T	X/Dc/W	J/Dj/Th	V/Dv/F							
1	2	3	4	5	PL4	U5/S4	U5/S4	U5/S5	U5/S4	U5/S5	S3
8 M/Dt/T	9	10	11	12	-	S5/U6	S5/U6	U6	S5/U6	U6	-
15	16	17	18	19	PL5	S6/U7	S6/U7	S6/U7	S6/U7	S6/U7	S5
22	23	24	25	26	EXAM LAB	S7/U8	S7/U8	S7/U8	S7/U8	S7/U8	
29	30	31	1	2	-	CO/CO	CO	CO/CO	CO/CO	CO	-
Noviembre / Novembre / November											
L/Dl/M	M/Dt/T	X/Dc/W	J/Dj/Th	V/Dv/F							
5	6	7	8	9	EE1						EE1
12	13	14	15	16	PL6	S8/U9	S8/U9	S8/U9	S8/U9	S8/U9	S6
19	20	21	22	23	PL7	S9/U10	S9/U10	S9/U10	S9/U10	S9/U10	S7
26	27	28	29	30	-	S10/U11	S10/U11	S10/U11	S10/U11	S10/U11	-
Diciembre / Decembre / December											
L/Dl/M	M/Dt/T	X/Dc/W	J/Dj/Th	V/Dv/F							
3	4	5 J/Dj/Th	6	7		S11/U12	S11/U12	S11	S11	S11/U12	
10	11	12	13	14	PL8	S12/CO	S12/CO	S12/U12	S12/U12	S12/CO	S11
17	18	19	20	21	PL9	CO/CO	CO/CO	CO/CO	CO/CO	CO/CO	S12
24	26	27	28	29							

CO = consolidation seminar, solving doubts and preparing evaluation

This schedule can be slightly changed along the semester if required

Continuous Evaluation

Evaluation Items	EEE1 Written Exam I	EEE2 Written Exam II	EPL Lab Sessions Evaluation	ETC Class Work Evaluation
Content	BT1 and BT2 UT1 to 6 SUT1 to 6	BT3 and BT4 UT7 to 12 SUT7 to 12	Two evaluation methods will be applied: PL01-PL05 PoliformaT exam PL06-PL09 Supervising	PoliformaT exams and attendance control

If (EEE1*0.3+EEE2 *0.4)>=3 out of 10

Continuous Evaluation Grade = EEE1*0.3 + EEE2* 0.4 + EPL*0.2 + ETC*0.1

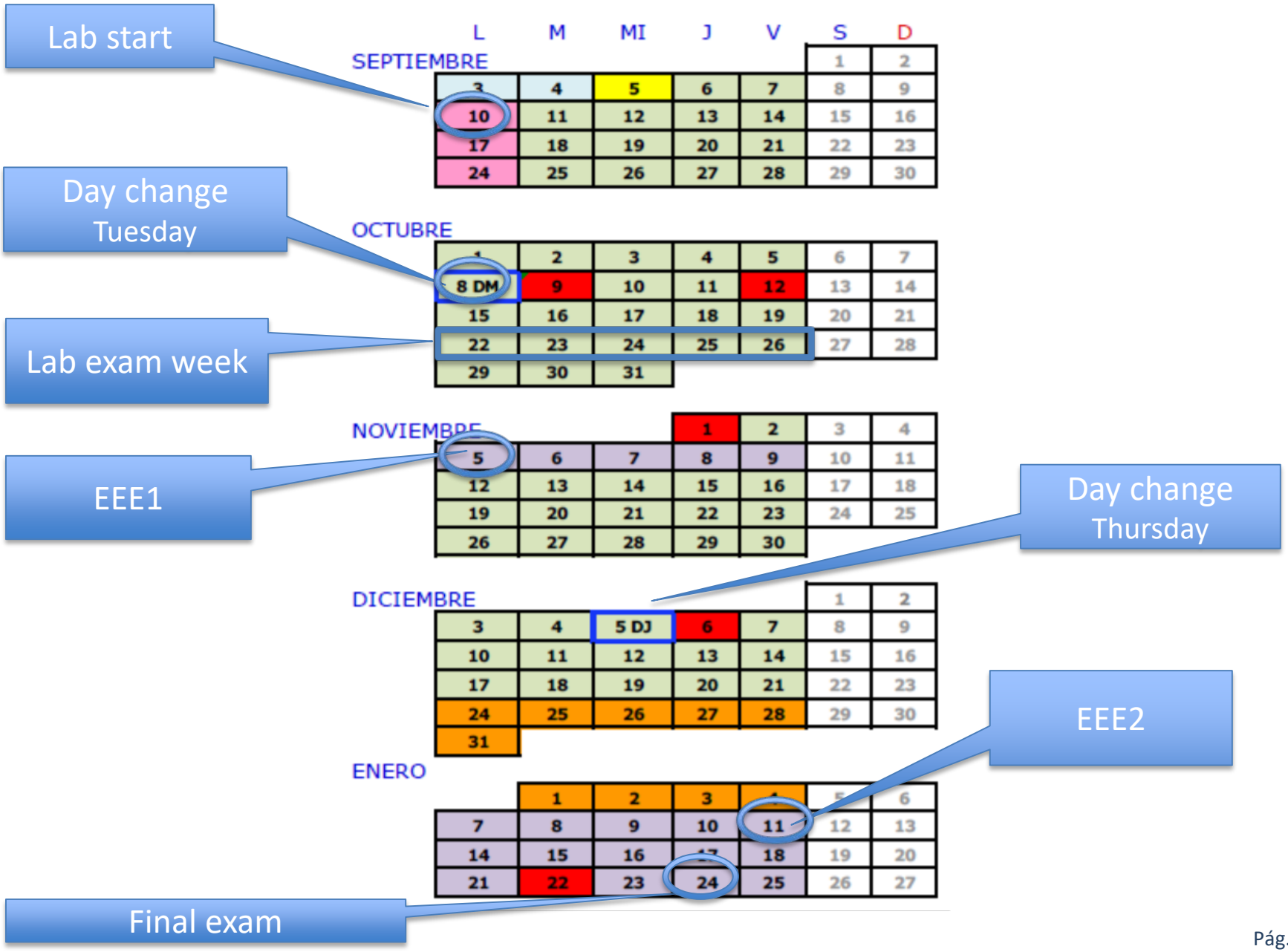
Final Evaluation (mandatory when Continuous Evaluation Grade < 5)

Exam	EEEF: Final Written Exam
Content	BT1 to BT4 : UT1 to 12 SUT1 to 12

If Final Written Exam >= 3 out of 10

Final Grade = EEEF* 0.7 + EPL*0.2 + ETC*0.1

Calendar


Lab start
Day change
Tuesday
Lab exam week
EEE1
Day change
Thursday
EEE2
Final exam
L M MI J V S D
SEPTIEMBRE
1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
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OCTUBRE
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NOVIEMBRE
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31
ENERO
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21 22 23 24 25 26 27

Bibliography

- **Basic book**
  - **"Operating System Concepts", A. Silberschatz. P.B. Galvin, 9th Ed. Wiley, 2012**
  - "Sistemas Operativos: Una visión Aplicada", J. Carretero, F. García, etc, 2nd Ed. Mc Graw Hill, 2007
- **Unix, C**
  - **"UNIX Systems Programing ", Kay A. Robbins, Steven Robbins, 2nd Ed. Prentice Hall, 2015**
  - "The C Programming Language", Brian W. Kernighan, Dennis M. Ritchie, 2nd Ed. Prentice Hall, 1991 (avail. Kindle)
  - "The UNIX Programming Environment", B.W. Kernighan, R. Pike. Prentice Hall 1987
  - "Ubuntu Unleashed 2017 Edition". Matthew Helmke, Andrew Hudson, Paul Hudson. SAMS, 2017 (avail. Kindle)
- **Course documentation in PoliformaT**
  - https://poliformat.upv.es