COURSE: Systems and Circuits		
DEGREE: Audiovisual Systems Engineering	YEAR: 1	TERM: 2

La asignatura tiene 29 sesiones que se distribuyen a lo largo de 14 semanas. Los laboratorios pueden situarse en cualquiera de ellas.
Semanalmente el alumnos tendrá dos sesiones, excepto en un caso que serán tres

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	GROUPS (mark X)		SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)	Indicate YES/NO If the session needs 2 teachers	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS (Max. 7h week)

1	1	Unit 1. Signals
		• Introduction
		• Classification
		  ○ Continuos and discrete time
		• Basic operations
		  ○ Sum, Multiplication, Integration, Differentiation
		  ○ Time-Shift
		  ○ Reflection
		  ○ Time Scaling
		• Basic signals. Intro.
			X			NO	Read Chapter 1 of the textbook “Signals and Systems”, Oppenheim
							Sections 1.1 and 1.2
								1,6	

1	2	• Exercises		X		NO	Problems 1.21 and 1.22 (“Signals and Systems”, Oppenheim)	1,6	7

2	3	• Signal Properties
		  ○ Simmetry: Even and odd part
		  ○ Periodicity
		  ○ Average, power, energy
			X			NO	Read Chapter 1 of the textbook “Signals and Systems”
							Sections 1.1 and 1.2
								1,6	

2	4	Exercises on signal properties.		X		NO	Problems 1.23 and 1.24 (“Signals and Systems”, Oppenheim)	1,6	7

							Problems 1.3 and 1.13 (“Signals and Systems”, Oppenheim)		
3	5	• Basic signals. o Unitary Impulse and step. o Exponential signal o Periodicity.	X			NO	Read Chapter 1 of the textbook “Signals and Systems” Section 1.4	1,6	
3	6	Exercises on unit impulse and step.		X		NO	Problems 1.12 and 1.14 (“Signals and Systems”,Oppenheim)	1,6	7
4	7	**Unit 2. Systems** • Introduction • Interconnection o Series/Parallel/Feedback • Properties o Memory o Causality o Invertibility	X			NO	Read Chapter 1 of the textbook “Signals and Systems” Sections 1.5 and 1.6	1,6	
4	8	**Lab Session 1**		X	Computer classroom.	NO		1,6	7
5	9	• Properties (cont.) o Stability o Linearity o Time Invariance				NO	Read Chapter 1 of the textbook “Signals and Systems” Sections 1.5 and 1.6	1,6	
5	10	Exercises on systems properties				NO	Problems 1.27, 1.28 and 1.30 (*“Signals and Systems”*, Oppenheim)	1,6	7
6	11	• Linear Time-Invariant (LTI) Systems o Impulse Response • Convolution o Properties				NO	Read Chapter 2 of the textbook “Signals and Systems” Section 2.2	1,6	
6	12	Exercises on convolution				NO	Problems 2.4, 2.11, 2.21, 2.22 and 2.23 (*“Signals and Systems”*, Oppenheim)	1,6	7
7	13	Properties of LTI Systems				NO	Read Chapter 2 of the textbook “Signals and Systems” Section 2.3 Problems 2.28 and 2.29 (*“Signals and Systems”*, Oppenheim)	1,6	
7	14	**Lab. Session 2**			Computer classroom	NO		1,6	7
8	15	**Exam. Signals and Systems**				NO		1,6	7

8	16	**Unit 3. Resistive Circuits** • Introduction • Voltage, Current, Power • Elements in circuits o Actives: source generators. o Pasives: Resistors, capacitors, Inductors o Nodes, branches, loops, meshes • Kirchhoff Laws o Current Law Voltage Law				NO	Read Chapter 2 of the textbook "Electric Circuits", Nilsson Sections 2.1, 2.2, 2.3, 2.4 and 2.5	1,6	
9	17	• Simple Resistive Circuits o Voltage and current divider o Series and Parallel resistors. • Circuit Analysis o Voltage Node Method Mesh current method				NO	Read Chapter 3 of the textbook "Electric Circuits" Sections 3.1, 3.2, 3.3 and 3.4 Problems 2.3, 2.8, 2.16, 2.21, 2.26, 2.27 and 2.29 ("Electric Circuits", Nilsson) Problems P2, P7, P15 (bulletin)	1,6	
9	18	• Exercises on Circuit Analysis o Voltage Node Method Mesh current method				NO	Read Chapter 4 of the textbook "Electric Circuits" Sections 4.1, 4.2 4,3, 4.4, 4.5, 4.6, 4,7 and 4.8	1,6	7
10	19	• Thèvenin and Norton equivalents Source Transformation				NO	Read Chapter 4 of the textbook "Electric Circuits" Sections 4.9, 4.10, 4,11, 4.12 and 4.13 Problems 4.9, 4.13, 4.17, 4,20 and 4.26 ("Electric Circuits", Nilsson) Problems P16, P17, P21 (bulletin)	1,6	
10	20	**Lab. Session 3**			Laboratory	NO		1,6	7
11	21	**Unit 4. Analog Filters: time behaviour** • Introduction • Inductors and capacitors o Series, parallel configurations				NO	Read Chapter 6 of the textbook "Electric Circuits" Sections 6.1, 6.2 and 6.3	1,6	7

		• Electric Analysis: differential equations ○ First Order Filters (RC, RL) • Auxiliary conditions. Initial conditions. • First order filters ○ Natural response Step response.					Read Chapter 7 of the textbook "Electric Circuits" Sections 7.1, 7.2, 7.3 and 7.4		
11	22	• Exercises on RC, RL circuits ○ Natural response ○ Step Response Switches				NO	Problems 7.63, 7.65 and 7.73 (Electric Circuits, Nilsson) Problems P1, P2, P3 (bulletin)	1,6	
12	23	**Unit 5. Sinusoidal steady state analysis** • Introduction: Sinusoidal sources. Phasor. • Passive Circuit Elements in the Frequency Domain. ○ Impedance • Kirchhoff's Laws in the Frequency Domain. • Circuit Analysis ○ Voltage Node Method ○ Mesh current method				NO	Read Chapter 9 of the textbook "Electric Circuits" Sections 9.1 – 9.5 and 9.8 – 9.9	1,6	
12	24	Exercises on sinusoidal steady state				NO	Problems 9.48, 9.52 and 9.50 (*"Electric Circuits"*, Nilsson) Problems P2, P4, P5, P6 (bulletin)	1,6	7
13	25	• Thèvenin and Norton equivalents • Maximum Power Transfer Exercises on sinusoidal steady state				NO	Read Chapter 9 of the textbook "Electric Circuits" Section 9.7	1,6	
13	26	Exercises on sinusoidal steady state				NO	Problems 9.58, 9.62 and 9.60 (*"Electric Circuits"*, Nilsson) Problems P7, P8, P9, P20 (bulletin)	1,6	7
14	27	Exercises on sinusoidal steady state **Overview of units 3-5**				NO	Course study and review	1,6	7
14	28	Office hours, Final Exam Preparation				NO	Course study and review	1,6	7
	29	**Lab. Session 4**			Laboratory	NO		1,6	7
							Subtotal 1	**48,33**	**98**

Total 1 *(Hours of class plus student homework hours between weeks 1-14)*	146,33

15		Tutorials, handing in, etc				NO			
16		Assessment						3	21
17									
18						NO			
							Subtotal 2	**3**	

Total 2 *(Hours of class plus student homework hours between weeks 15-18)*	24

TOTAL *(Total 1 + Total 2. Maximum 180 hours)*	**170,33**