Universidad Carlos III de Madrid
www.uc3m.es

COURSE: ELECTRONIC SYSTEMS		
DEGREE: TELECOMUNICATION TECHNOLOGY / BIOMEDICAL ENGINEERING	YEAR: 3	TERM: 1

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	GROUP			Session needs 2 teachers	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS
1		**Introduction**	X			NO			
1	1	**Chapter 1: Revision of the Basic Concepts of Electronic Amplifiers** Gain, input and output impedances, bandwidth Single stage amplifier: bias, gain, bandwidth Multistage amplifier: charge effects		X		NO	Review of theory covered in Chapter 1. Complete proposed application examples (analysis of feedback amplifiers) (amplifiers analysis and Bode diagram representation)	1,67	**6**
2	2	**Chapter 2: Feedback Electronic Circuits. (I)** 1. Basic concepts of the theory related to feedback electronics. 2. Electronic feedback circuit topologies: - Series-Shunt, Shunt-Shunt, Shunt-Series, Series-Series topologies. 3.Calculation of the gain, input impedance and output impedance in feedback circuits.	X			NO	Study of the theory covered in Chapter 2. Complete proposed application examples (analysis of feedback amplifiers).	1,67	**6**
2	3	**Exercises related to Chapter 2 (I): Feedback Electronic Circuits.** 1. Conception of the practical or approximate method used to solve negative feedback circuits 2. Examples		X		NO		1,67	
3	4	**Chapter 2: Feedback Electronic Circuits (II).** 3. Basic configurations of the beta network according to the different topologies. 4. Study of feedback circuits for each one of the different topologies.	X			NO	Complete proposed application examples of Chapter 2 (analysis of feedback amplifiers)	1,67	**6**
3	5	**Exercises related to Chapter 2 (II):** Exercises and problems related to real feedback circuits.		X		NO		1,67	
4	6	**Chapter 3. Frequency Analysis of Electronic Feedback Circuits.** 1. Frequency analysis of a feedback amplifier: - With 1, 2 and 3 poles 2.-Stablility study of a feedback amplifier using the Bode diagram	X			NO	Study of the theory covered in Chapter 3	1,67	**7**
4	7	**Chapter 3**: **Frequency Analysis of Feedback Electronic Circuits** 3. Compensation Methods. Exercices -Beta network modification. - Dominant pole compensation. - Pole – Zero compensation.		X		NO		1,67	
5	8	**Chapter 4. Sinusoidal Oscillators (I)** 1. Start up condition and oscillator maintenance. 2.General configuration of an oscillator. 3. RC oscillators: - Wien Bridge Oscillator. - Phase shift network oscillator. 4. Amplitude limiters	X			NO	Study of the theory covered in Chapter 4. Complete proposed application examples of Chapter 3 (stability study and frequency compensation methods for feedback amplifiers)	1,67	**6**
5	9	**Exercises Chapter 3**		X		NO		1,67	
6	10	**Chapter 4: Sinusoidal Oscillators (II)** 5. LC Oscillators: - Colpitts Oscillator. - Hartley Oscillator. - Clapp Oscillator. 6. Crystal Oscillators (Xtal) - Crystal characteristics (Xtal) piezoelectrics. - Series and shunt crystal resonant frequencies. - Crystal oscillator schemes	X			NO	Study and exercies of Chapter 4 (sinusoidal oscillator analysis) **Exam 1 preparation**	1,67	**7**
6	11	**Application Exercises for Chapter 4: Problems RC, LC and Xtal Oscillators.**		X		NO		1,67	

Universidad Carlos III de Madrid
www.uc3m.es

COURSE: ELECTRONIC SYSTEMS		
DEGREE: TELECOMUNICATION TECHNOLOGY / BIOMEDICAL ENGINEERING	YEAR: 3	TERM: 1

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	GROUP			Session needs 2 teachers	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS
7	12	**Chapter 5: Operational Amplifier and Application Circuits, and examples (I)** 1. Ideal Operational Amplifier (review) 2. Real Operational Amplifier - DC Errors (voltage Offset, bias currents and Offset) - Medium frequency characteristics (input and output resistance, differential gain, CMRR) - Maximum output current - Gain Bandwidth Product (GxBW) - Slew Rate (SR) **Exam 1 (50 min) Chapters 2-4**	X			NO	Study of the theory covered in Chapter 5. Complete proposed application examples (real opamps, linear and non-linear application circuits)	1,67	**5**
7	13	**Chapter 5: Operational Amplifier and Application Circuits, and examples (II)** Active filters as linear application - Ideal and real integrator. Ideal and real Differentiator - First order circuits. Low pass, High pass, PI - Second order circuits. Sallen-Key		X		NO		1,67	
8	14	**Chapter 5: Operational Amplifier and Application Circuits, and examples (IV)** Non linear applications - Simple comparator - Comparator with hysteresis (Schmitt Trigger) - Relaxation oscillator	X			NO	Study of the theory covered in Chapter 5. Complete proposed application examples (active filters, comparators and relaxation oscillators)	1,67	**7**
8	15	**Exercises for Chapter 5**		X		NO		1,67	
9	16	**Chapter 6. The 555 integrated timer and Examples** - Structure and functioning principles - Monostable - Astable and VCO - Application examples	X			NO	Study of the theory covered in Chapter 6 (applications of 555 timer) **Lab Session 1 preparation** (detailed reading of manual and development of previous calculations)	1,67	**6**
9	17	**Lab Session 1**		X	LAB	YES		2,50	
10	18	**Chapter 7: PLLs (I)** - Blocks diagram and working principle. - PLL components: phase detector, filter (first order), VCO. - PLL transfer function. PLL types.	X			NO	Study of the theory covered in Chapter 7. Complete proposed application examples (PLL components: phase detector, filter (first order), VCO). **Lab Session 2 preparation** (detailed reading of manual and development of previous calculations)	1,67	**5**
10	19	**Lab Session 2**		X	LAB	YES		2,50	
11	20	**Chapter 7: PLLs (II)** - 1st order PLL. Examples. - 2nd order PLL. Examples. - PLL Applications.	X			NO	Study of the theory covered in Chapter 7. Complete proposed application examples (1^{st} and 2^{nd} order PLLs and PLL applications)	1,67	**5**
11	21	**Application Exercises for Chapter 7: PLLs**		X		NO		1,67	
12	22	**Chapter 8: Linear Voltage Regulators and Switching DC/DC Converters (I).** - Series – Shunt feedback in linear voltage regulators. - Basic design of a linear voltage regulator. - Power and efficiency calculations.	X			NO	Study of the theory covered in Chapter 8 (Linear Voltage Regulators). **Lab Session 3 preparation** (detailed reading of manual and development of previous calculations). **Exam 2 preparation**	1,67	**7**
12	23	**Lab Session 3**		X	LAB	YES		2,50	

Universidad Carlos III de Madrid
www.uc3m.es

COURSE: ELECTRONIC SYSTEMS		
DEGREE: TELECOMUNICATION TECHNOLOGY / BIOMEDICAL ENGINEERING	YEAR: 3	TERM: 1

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	GROUP			Session needs 2 teachers	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS
13	24	**Chapter 8: Linear Voltage Regulators and Switching DC/DC Converters (II).** - Fundamentals of switching DC/DC Converters. - Basic operation of Buck converter. **Exam 2 (50 min) Chapters 5-7.**	X			NO	Study of the theory covered in Chapter 8 (switching DC/DC Converters). Complete proposed application examples (Linear Voltage Regulators and Switching DC/DC Converters).	1,67	**6**
13	25	**Application Exercises for Chapter 8: Linear Voltage Regulators and Switching DC/DC Converters.** - Basic design of Buck converter. - Negative feedback in a switching DC/DC Converters.		X		NO		1,67	
14	26	**Chapter 9: energy systems for Telecommunications. Specifications, regulations and Topologies.** - DC/DC and AC/DC Converters for Telecommunications. - Uninterruptible power supply systems (UPS) for Telecommunications. **Chapter 10: Energy Converters. Solar photovoltaic, eolic, others.** - Basic analysis of a photovoltaic generator - Basic analysis of the eolic generator. - Description of other Systems related to electrical energy generation.	X			NO	Study of the theory covered in Chapter 9 and 10. Lab Session 4 preparation (detailed reading of manual and development of previous calculations). **Lab final report generation.**	1,67	**6**
14	27	**Lab Session 4. Lab exam.**		X	LAB	YES		2,50	
								48,33	85
							Subtotal 1	133,33	
15		Tutorials, handing in, etc					Tutorial	1,67	
16 - 18		Assessment						3	12
							Subtotal 2	16,67	
TOTAL *(Total 1 + Total 2. Maximum 180 hours)*								**150,00**	