

COURSE: ELECTRONIC SYSTEMS

DEGREE: TELECOMUNICATION TECHNOLOGY / BIOMEDICAL ENGINEERING

YEAR: 3

TERM: 1

P B LELTURE SEMIRARS 2 teachers DESCRIPTION HOUR 1 Introduction X NO Review of theory covered in Chapter 1. Complete proposed application examples (analysis of feedback amplifer) 1.67 1 1 Gampa and output impedances, bandwidth Single stage amplifer. bias, gain, bandwidth Multitate amplifer. thiss, gain, bandwidth Multitate amplifer. thiss, gain, bandwidth Multitate amplifer. bias, gain, bandwidth Multitate amplifer			
1 Introduction X NO Review of theory covered in Chapter 1. Complete proposed application examples (analysis of feedback amplifiers) (amplifiers analysis and Bode dagram representation) 1.67 1 1 Chapter 1. Revision of the Basic Concepts of Electronic Amplifiers) (amplifiers analysis and Bode dagram representation) 1.67 2 2 2. Representation of the theory covered in Chapter 2. Complete proposed application examples (analysis of feedback amplifiers). 1.67 2 2. SeriesShutt, Shutt, Shutt	WEEKLY PROGRAMMING FOR STUDENT		
Chapter 1: Revision of the Basic Concepts of Electronic Amplifiers Gain, Input and output impedances, inclusion Woltstate amplifier: bias, gain, bandwidth Multistate amplifier: bias, gain, bandwidth Multistate amplifier: bias, gain, bandwidth Multistate amplifier: bias, gain, bandwidth X NO Review of theory covered in Chapter 1. Complete proposed application examples (analysis of feedback and (amplifiers analysis and Bode diagram representation) 1.67 2 2 Chapter 1: Revision of the Basic Concepts of the theory related to feedback electronics. - Series-Shurt, Shurt-Shurt, Shurt-Shurt, Shurt-Sherte, Series Stepologies. - Series-Shurt, Shurt-Shurt, Shurt-Shurt, Shurt-Sherte, Series Stepologies. - Series-Shurt, Shurt-Shurt, Shurt-Sherte, Series Stepologies. - Series-Shurt, Shurt-Shurt, Shurt-Sherte, Series Stepologies. - Series-Shurt, Shurt-Shurt, Shurt-Sherte, Series-Series topologies. - Series-Shurt, Shurt-Sherte, Series-Series topologies. - Series-Shurt, Shurt-Sherte, Series-Shurt, Shurt-Sherte, Series topologies. - Series-Shurt, Shurt-Sherte, Series-Shurt, Shurt-Series, Series topologies. - Series-Shurt, Shurt-Sherte, Series-Sherte topologies. - Series-Seriated to Chapter 2 (I): Feedback lettronic Circuits (II). - Complete proposed application examples of Chapter 2 (analysis of feedback amplifiers) NO 3 4 - Sudv of feedback amplifier using the different topologies. - Series-Shurt of Dapter 2 (II): - Complete proposed application examples of Chapter 2 (analysis of feedback amplifier) NO 4 - Chapter 3: - Reviewer and p	CLASS HOUR		
1 1 Gain_input and output impedances, bandwidth Multistage amplifier: bias, gain how differ: bias,			
2 2 1. Basic concepts of the theory related to feedback electronics. 2. Electronic feedback circuit topologies: 3. Calculation of the gain, input impedance and output impedance in feedback circuits. 3. Calculation of the gain, input impedance and output impedance in feedback circuits. 3. Calculation of the gain, input impedance and output impedance in feedback circuits. 2. Exercises related to Chapter 2 (i): Feedback Electronic Circuits. 2. Examples X NO NO Study of the theory covered in Chapter 2. Complete proposed application examples (analysis of feedback amplifiers). 1.67 3 4 5. Basic configurations of the beta network according to the different topologies. 4. Study of feedback circuits for each one of the different topologies. 4. Study of feedback circuits (II). 3. Exercises related to Chapter 2 (II): Exercises and problems related to real feedback circuits. 2. Stability study of a feedback amplifier: -2. Stability study of a feedback amplifier: -2. Stability study of a feedback amplifier. -2. Stability study and frequency compensation. -2. Stab	ed 1.67	1.67 6	
2 3 1. Conception of the practical or approximate method used to solve negative feedback circuits X NO 1.67 3 4. Stamples Chapter 2: Feedback Electronic Circuits (II). X NO Complete proposed application examples of Chapter 2 1.67 3 4. Study of feedback circuits for each one of the different topologies. X NO Complete proposed application examples of Chapter 2 1.67 3 5 Exercises and problems related to Chapter 2 (III): X NO Complete proposed application examples of Chapter 2 1.67 4 6 I. Frequency Analysis of Electronic Feedback Circuits. X NO NO 1.67 2Stability study of a feedback amplifier: With 1, 2 and 3 poles X NO NO 1.67 4 6 Chapter 3: Frequency Analysis of Feedback Electronic Circuits X NO Study of the theory covered in Chapter 3 1.67 4 7 3. Compensation. X NO NO Study of the theory covered in Chapter 4. 1.67 5 8. Ro oscillators: - Dominant pole compensation. - Pole - Zero compensation. - Pole - Zero compensation. - Pole - Zero compensation. - Pole - Zero compensation. - Wien Bridge Oscillators: - Wien Bridge Oscillators: - Wien	1.67 osed	1.67 6	
3 4 3. Basic configurations of the beta network according to the different topologies. X NO Complete proposed application examples of Chapter 2 (analysis of feedback amplifiers) 1.67 3 5 Exercises and problems related to chapter 2 (III): Exercises and problems related to chapter 3 (Frequency Analysis of Electronic Feedback Circuits. X NO NO 1.67 4 6 Chapter 3. Frequency Analysis of Electronic Circuits X NO NO 1.67 4 7 Complete proposed application examples of Chapter 3 X NO NO 1.67 4 7 Chapter 3. Frequency Analysis of Feedback amplifier: - With 1, 2 and 3 poles X NO NO NO 1.67 4 7 3. Compensation Methods. Exercices -Beta network modification. - Dominant pole compensation. - Pole = Zero compensation. - Pole = Zero compensation. - Pole = Zero compensation. - Pole = Zero compensation. - NO 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 5 8 3.RC oscillator. - With Bridge Osci	1.67	1.67	
3 5 Exercises related to Chapter 2 (II): 1.67 Exercises and problems related to real feedback circuits. 1.67 4 6 1. Frequency analysis of a feedback amplifier: 1.67 -With 1, 2 and 3 poles X NO NO 2Stability study of a feedback amplifier using the Bode diagram 1.67 4 7 3. Compensation Methods. Exercices -Bet network modification. 5 - Dominant pole compensation. - X NO - Dele - Zero compensation. - X NO - Study of the theory covered in Chapter 4. Study of the theory covered in Chapter 4. 1.67 - Dele - Zero compensation. - X NO - Study of the theory covered in Chapter 4. Study of the theory covered in Chapter 4. 1.67 - Study confliction and oscillator maintenance. 2. General configuration of an oscillator. 5 - Wien Bridge Oscillator: - X NO - Wien Bridge Oscillator. - - - - Wien Bridge Oscillator. - - - - - Wien Bridge Oscillator. - - - -	1.67	1.67 6	
4 6 Chapter 3. Frequency Analysis of Electronic Feedback Circuits. . With 1, 2 and 3 poles 2. Stability study of a feedback amplifier using the Bode diagram 2. Stability study of a feedback amplifier using the Bode diagram 2. Stability study of a feedback Electronic Circuits 3. Compensation Methods. Exercices -Beta network modification. - Dominant pole compensation. - Pole - Zero compensation. - Pole - Zero compensation of an oscillator s(I) 1. Start up condition and oscillator maintenance. 2. General configuration of an oscillator. - With Bridge Osc	1.67	1.67	
4 7 Chapter 3: Frequency Analysis of Feedback Electronic Circuits 1.67 3. Compensation Methods. Exercices -Beta network modification. X NO NO - Dominant pole compensation. - Pole - Zero compensation. 1.67 - Pole - Zero compensation. - Dominant pole compensation. 1.67 - Dominant pole compensation. - Dominant pole compensation. 1.67 - Pole - Zero compensation. - Dominant pole compensation. 1.67 - Study of the theory covered in Chapter 4. Study of the theory covered in Chapter 4. 1.67 2. General configuration of an oscillator. X NO Study of the theory covered in Chapter 4. 5 8 3. RC oscillators: X NO Complete proposed application examples of Chapter 3 1.67 - Wien Bridge Oscillator. - Phase shift network oscillator. X NO Complete proposed application examples of Chapter 3 1.67 4. Amplitude limiters X NO Y NO 1.67 5 9 Exercises Chapter 3 X NO NO 1.67 5 9 Exercises Chapter 3 X NO 1.67	1.67		
Sector Chapter 4. Sinusoidal Oscillators (I) 1. Start up condition and oscillator maintenance. Study of the theory covered in Chapter 4. 2. General configuration of an oscillator. 3. RC oscillators: X NO Study of the theory covered in Chapter 4. 1.67 4. Amplitude limiters - Phase shift network oscillator. X NO Complete proposed application examples of Chapter 3 1.67 5 9 Exercises Chapter 3 X NO 1.67 Chapter 4: Sinusoidal Oscillators (II) X NO NO 1.67	1.67	7 1.67	
Chapter 4: Sinusoidal Oscillators (II)		6	
	1.67	1.67	
 6 J0 - Clapp Oscillator. 6 Crystal Oscillators (Xtal) 7 Crystal characteristics (Xtal) piezoelectrics. 9 Series and shunt crystal resonant frequencies. 	lysis) 1.67	1.67 7	
6 11 Application Exercises for Chapter 4: Problems RC, LC and Xtal Oscillators. X NO	1.67	1.67	



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WEEKLY PLANNING									
×	SESSION	DESCRIPTION	GROUP			Session	WEEKLY PROGRAMMING FOR STUDENT		
WEEK			LECTURES	SEMINARS	needs 2 teachers	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		×		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		Х	LAB	YES		2.50	1
10	18	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 2 preparation (detailed reading of manual and development of previous calculations).	1.67	7
10	19	Lab Session 2		Х	LAB	YES	l	2.50	<u> </u>
11	20	Chapter 8: Linear Voltage Regulators and Switching DC/DC Converters (II). - Fundamentals of switching DC/DC Converters. - Basic operation of Buck converter.	х			NO	Study of the theory covered in Chapter 8 (switching DC/DC	1.67	
11	21	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	Converters). Complete proposed application examples (Linear Voltage Regulators and Switching DC/DC Converters).	1.67	6
12	22	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 3 preparation (detailed reading of manual and development of previous calculations)	1.67	5



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WEEKLY PLANNING										
¥	z		GROUP			Session	WEEKLY PROGRAMMING FOR STUDENT			
WEEK	SESSION	DESCRIPTION	LECTURES	SEMINARS	rs		needs 2 teachers	DESCRIPTION	CLASS HOURS	HOMEWORK HOURS
12	23	Lab Session 3		Х	LAB	YES	Exam 2 preparation	2.50		
13	24	Chapter 7: PLLs (II) - 1st order PLL. Examples. - 2nd order PLL. Examples. - PLL Applications. Exam 2 (50 min) Chapters 5,6,8.	x				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	
13	25	Application Exercises for Chapter 7: PLLs		Х		NO	1	1.67	1	
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				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.		Х	LAB	YES	1	2.50	1	
							Subtotal 1	48.33	85 133.33	
15		Tutorials, handing in, etc					Tutorial		1.67	
16 - 18		Assessment					Cultured 2	3	12 16.67	
							Subtotal 2		10.0/	
TOTAL (OTAL (Total 1 + Total 2. Maximum 180 hours)							150.00		