Lesson Plan

Faculty: Dr. Deepak V. Bhoir, Swapnali Makdey

CLASS		TE Electronics, Semester V	
Academic Term		July 2019 – October 2019	
Subject		**Design with Linear Integrated circuit**	
Periods (Hours) per week	***Lecture***	***4***	
	Practical	***-***	
	Tutorial	***--***	
Evaluation System		***Hours***	***Marks***
	Theory examination	3	80
	Internal Assessment	--	20
	Oral/Practical Examination	--	25
	Term work	--	25
	Total	--	150

Time Table	***Day***	***Time***
	Monday	8.45am-9.45am
	Tuesday	1.30pm-3.30pm
	Wednesday	3.30pm-4.30pm
	Friday	1.30pm-2.30pm

Course Content and Lesson plan

Module 1

Week	**Lecture No.**	**Date**		**Topic**	**Remarks(If any)**
		Planned	**Actual**		
1	1	1-7-2019		Introduction to syllabus and approach towards the integrated circuit, Concept of Design with Linear ICs, Corse Outcomes	

	2	2-7-2019		Ideal characteristics of Op-amp , Definition of each parameter, FBD	
	3	4-7-2019		Transfer Characteristics, Ideal and Practical	
2	4	8-7-2019		Inverting Amplifier and its analysis(Gain, Input impedance, Virtual ground concept) Non-inverting Amplifier and its analysis	
	5	9-7-2019		Summing amplifier, Averaging Amplifier, Difference Amplifier,	
	6	11-7-2019		Instrumentation Amplifier, Derivation of gain and its features	
3	7	12-7-2019		Oscillators, RC: Wien Bridge	
	8	15-7-2019		Oscillators, RC: Phase shift oscillators Design of audio frequency oscillators	
	9	16-7-2019		Integrator, practical integrator, applications	
	10	17-7-2019		Differentiators, Difficulties, Design of linear circuits with more than one variables Single supply Op-amp integrated circuit.	
4	11	19-7-2019		I/V and V/I converter with grounded and floating load	
	12	22-7-2019		Nonlinear Applications, Comparators,	Assignment 1
	13	23-7-2019		Window comparator, Applications and design	
	14	24-7-2019		Schmitt Trigger and its design	
5	15	26-7-2019		Square wave generator Astable Multi-vibrator and Design	
	16	29-7-2019		Monostable Multivibrator and Design of the delay.	
	17	30-7-2019		Triangular waveform generator	
	18	31-7-2019		Precision Rectifier both +ve and –ve and HWR and FWR	
6	19	1-8-2019		Peak Detector, Sample and Hold circuit	
	20	5-8-2019		Logarithmic Amplifier and Antilog Amplifier,	
	21	6-8-2019		Temperature Compensation in logarithmic Amplifier	

	22	7-8-2019		V/F and F/V Converters, Gyrator	
7	23	9-8-2019		Determination of parameters practicallyIC ,Issues with parameter variations in design, Active filters and its features, advantages of active filters, Design of second order filters. First order filters such as LP,HP,BP and	Assignment 2
	24	19-8-2019		IC 555 Functional block diagram and its features BRF design 555 a-stable and mono-stable multi-vibrator, design	
	25	20-8-2019		VCO IC 556 , features and functional block diagram, applications	
	26	21-8-2019		PLL IC 565, Basic block diagram and applications	
8	27	26-8-2019		IC 534 multiplier, Waveform generator ICXR2206, Power Amplifier LM380	Assignment 3
	28	27-8-2019		Design using above ICs	
	29	28-8-2019		Basic block diagram of Voltage Regulator	
	30	30-8-2019		Fixed voltage and Variable voltage regulators 78XX, 79XX, LM317, LM337	
9	31	9-9-2019		Design with three terminal voltage regulators	
	32	11-9-2019		Functional Block diagram of IC 723 and its features	
	33	13-9-2019		Design of LVLC and HVLC	
10	34	16-9-2019		Design of LVHC and HVHC	
	35	17-9-2019		Special applications of voltage regulators	
	36	18-9-2019		Design problems	
	37	20-9-2019		Design problems	Assignment 4
11	38	23-9-2019		Design problems	
	39	24-9-2019		Data Converters D/A and A/D classifications	
	40	25-9-2019		Successive approximation method ADC 809	
	41	27-9-2019		Flash type ADC Design	
12	42	30-9-2019		Dual slope ADC	
	43	1-10-2019		DAC weighted resistance and R/2R DAC 808	
	44	4-10-2019		Design with above ICS	
	45	7-10-2019		Design problems with above ICS	

Total	45				

Text- Books:

1. Sergio Franco, "*Design with operational amplifiers and analog integrated circuits*", Tata McGraw Hill, 3rd Edition.
2. William D. Stanley, "*Operational Amplifiers with Linear Integrated Circuits* ", Pearson, 4th Edition
3. D. Roy Choudhury and S. B. Jain, "*Linear Integrated Circuits*", New Age International Publishers, 4th Edition.
4. David A. Bell, "*Operation Amplifiers and Linear Integrated Circuits*", Oxford University Press, Indian Edition.
5. Ramakant A. Gayakwad, "*Op-Amps and Linear Integrated Circuits*", Pearson Prentice Hall, 4th Edition.
6. J. Millman and A. Grabel, "*Microelectronics*", Tata McGraw Hill, 2nd Edition.

Examination Scheme

Module		Lecture Hours	Marks distribution in Test (For internal assessment/TW)		Approximate Marks distribution in Sem. End Examination
			Test 1	Test 2	
1	Fundamentals of Operational Amplifier	06	05		10 marks
2	Applications of Operational Amplifier	12	08		30 marks
3	Non-Linear Applications of Operational Amplifier	12	07		30 marks
4	Data Converters	06		08	10 marks
5	Special Purpose Integrated Circuits	08		07	20 marks
6	Voltage Regulators	08		05	20 marks

Term Work:

At least 10 experiments based on the entire syllabus of Subject **EXC502 (Design with Linear Integrated Circuits)** should be set to have well predefined inference and conclusion. Few computation/simulation based experiments are encouraged. The experiments should be students' centric and attempt should be made to make experiments more meaningful, interesting and innovative. Term work assessment must be based on the **overall performance** of the student with **every experiment graded from time to time**. The grades should be converted into marks as per the **Credit and Grading System** manual and should be **added and averaged**. The grading and term work assessment should be done based on this scheme.
The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.
Practical and Oral exam will be based on the entire syllabus.
Internal Assessment (IA):

Two tests must be conducted which should cover at least 80% of syllabus. The average marks of both the tests will be considered as final IA marks

End Semester Examination:
1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. Total 4 questions need to be solved.
3: Question No.1 will be compulsory and based on entire syllabus wherein sub questions of 2 to 5 marks will be asked.
4: Remaining questions will be selected from all the modules.

Course Outcome
After successful completion of the course student will be able to

1. Demonstrate an understanding of fundamentals of integrated circuits.
2. Analyze the various applications and circuits based on particular linear integrated circuit.
3. Select and use an appropriate integrated circuit to build a given application
4. Design an application with the use of integrated circuit