



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	:	Instrumentation & Control Engineering			
Course Name & code	:	LINEAR INTEGRATED CIRCUITS & ICE 2254			
Semester & branch	:	4TH & ELECTRONICS AND INSTRUMENTATION			
Name of the faculty	:	Preeti Mohanty			
No of contact hours/week:		L	T	P	C
		3	1	0	4

Course Outcomes (COs)

<i>At the end of this course, the student should be able to:</i>		No. of Contact Hours	Marks
CO1:	Understand the basics of ideal Operational Amplifier and analyze its linear applications.	12	26
CO2:	Understand the limitations of Operational Amplifiers and design of active filters.	10	22
CO3:	Design and analyze operational Amplifiers for Non-linear applications.	14	31
CO4:	Design and analyze data converters using Operational Amplifiers.	6	11
CO5:	Design using regulator and PLL IC's for various applications.	6	10
Total		48	100

Assessment Plan

Components	Assignments	Sessional Tests	End Semester/ Make-up Examination
Duration	20 to 30 minutes	60 minutes	180 minutes
Weightage	20 % (4 X 5 marks)	30 % (2 X 15 Marks)	50 % (1 X 50 Marks)
Typology of Questions	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation	Knowledge/ Recall; Understanding/ Comprehension; Application	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation
Pattern	Answer one randomly selected question from the problem sheet (Students can refer their class notes)	MCQ: 10 questions (0.5 marks) Short Answers: 5 questions (2 marks)	Answer all 5 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks
Schedule	4, 7, 10, and 13 th week of academic calendar	Calendared activity	Calendared activity
Topics Covered	Quiz 1 (L 1-8 & T 1-2) (CO1)	Test 1 (L 1-14 & T 1-4) (CO1,2)	Comprehensive examination covering full syllabus. Students are expected to answer all questions (CO1-5)
	Quiz 2 (L 11-17 & T 4-5) (CO2)		
	Quiz 3 (L 18-24 & T 6-7) (CO3)	Test 2 (L 15-27 & T 5-9) (CO2,3)	
	Quiz 4 (L 28-32 & T 9-10) (CO4)		

Lesson Plan

L. No.	Topics	Course Outcome Addressed
L0	Introduction to the course	CO1
L1	Basic Op Amp configurations	CO1
L2	Basic Op Amp configurations-continued	CO1
L3	Ideal Op Amp circuit analysis	CO1
T1	Tutorial	CO1
L4	Feedback in Op Amp	CO1
L5	Op Amp powering	CO1
L6	I to V and V to I Converters	CO1
T2	Tutorial	CO1
L7	Current amplifiers	CO1
L8	Difference Amplifiers	CO1

L9	Instrumentation Amplifiers and Transducer Bridge Amplifiers	CO1
T3	Tutorial	CO1
L10	Active Filter-Introduction, characteristics and Transfer function	CO2
L11	First order filters	CO2
L12	Second order filters	CO2
T4	Tutorial	CO2
L13	Multiple feedback filters	CO2
L14	Design of Butterworth filter.	CO2
L15	Static Op Amp limitation-Offset voltages, Offset currents	CO2
T5	Tutorial	CO2
L16	Compensation techniques	CO2
L17	Frequency response and transient response	CO2
L18	Voltage comparators and applications	CO3
T6	Tutorial	CO3
L19	Schmitt trigger	CO3
L20	Precision rectifiers	CO3
L21	Peak detector and Sample and hold circuit.	CO3
T7	Tutorial	CO3
L22	Sine wave generators	CO3
L23	Sine wave generators-continued	CO3
L24	Multivibrators	CO3
T8	Tutorial	CO3
L25	Monolithic Timers	CO3
L26	Triangular wave generators	CO3
L27	Voltage to frequency converters and Frequency to voltage converters	CO3
T9	Tutorial	CO3
L28	D-A Converters- Performance specifications	CO4
L29	D-A conversion techniques	CO4
L30	A-D Converters- DAC based	CO4

T10	Tutorial	CO4
L31	A-D Converters- DAC based	CO4
L32	Flash, Successive approximation and Integrating type ADC	CO4
L33	Voltage Regulators: Performance specifications	CO5
T11	Tutorial	CO5
L34	Linear voltage regulator- IC voltage regulators	CO5
L35	Phase locked Loops: Basic PLL	CO5
L36	VCO- Applications.	CO5
T12	Tutorial	CO5
L/T	Click or tap here to enter text.	

References:

1. Franco Sergio, Design with Op amps & Analog Integrated Circuits, McGraw Hill, (3e), 2017
2. Ramakant A. Gayakwad, Op-Amps and Linear Integrated Circuits, PHI, (4e), 2015.
3. Robert F. Coughlin and Frederick S. Driscoll, Operational Amplifiers and Linear Integrated Circuits. Pearson education Pvt ltd., 2002
4. Sedra and Smith, Micro Electronic Circuits, Oxford university press, (6e), 2000.
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Submitted by: PREETI MOHANTY

(Signature of the faculty)

Date: 14-02-2022

Approved by: DR. SHREESHA C

(Signature of HOD)

Date: 15-02-2022

FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

FACULTY	SECTION	FACULTY	SECTION
Ms. Preeti Mohanty	A	Dr. Nilesh Anand Srivastava	B
