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Linear Integrated Circuits

(Code : ELC503)

Semester V – Electronics Engineering
(Mumbai University)

Strictly as per New Choice Based Credit and Grading System Syllabus
(Revise 2019 'C' Scheme) of Mumbai University with effective from Academic Year 2021-2022

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(Semester V, Electronics Engineering, Mumbai University)
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We dedicate this Publication soulfully and wholeheartedly,

in loving memory of our beloved founder director,

Late Shri. Pradeepji Lalchandji Lunawat,

who will always be an inspiration, a positive force and strong support

behind us.

"My work is my prayer to God"

- Lt. Shri. Pradeepji L. Lunawat

Soulful Tribute and Gratitude for all Your
Sacrifices, Hardwork and 40 years of Strong Vision…

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Syllabus…

Linear Integrated Circuits : Sem. V, (Electronics Engineering (MU))

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Theory/Pract.	Tut.	Total
ELC503	Linear Integrated Circuits	03		–	03	–	–	03

Subject Code	Subject Name	Examination Scheme								
		Theory Marks					Term Work	Practical	Oral	Total
		Internal Assessment			End Sem. Exam	Exam Duration Hours				
		Test 1	Test 2	Avg of Test 1 and Test 2						
ELC503	LIC	20	20	20	80	03				100

Course Pre-requisite :

1. Electronic Devices and Circuits I
2. Electronic Devices and Circuits II

Course Objectives :

1. To teach fundamental principles of standard linear integrated circuits.
2. To develop a overall approach for students from selection of integrated circuit, study its specification, the functionality, design and practical applications

Course Outcomes :

After successful completion of the course students 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
5. Design a real life application using certain linear Integrated Circuits.
6. Design of power supply with proper selection of the regulator IC.

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Module 1

Fundamentals of Operational Amplifier :

Block diagram of op-amp, Characteristics of op-amp, op-amp parameters, High frequency effects on op-amp gain and phase, slew rate limitation, single supply versus dual supply op-amp. **Configurations of op-amp :** Open loop and Closed loop configuration, Inverting amplifier and Non inverting amplifier.

(Refer Chapter 1)

Module 2

Linear Applications of Operational Amplifier :

Adder, Subtractor, Difference amplifier, Integrator, Differentiator, Three Op-amp Instrumentation amplifier, V-I converter, I-V converter **Active Filters :** Transfer function, Design of First order and Second order of LPF, HPF, BPF and BRF. **Oscillators :** RC phase shift and Wein bridge oscillators.

(Refer Chapters 2 and 3)

Module 3

Non-linear Applications of Operational Amplifier :

Voltage Comparators, Applications of comparator as zero crossing detector, Window comparator, Level detector, Schmitt triggers, Half wave and full wave Precision rectifiers, Peak detectors, Sample and Hold circuit, Log and Antilog amplifier. **Waveform generators :** - Square wave and Triangular wave generator circuit.

(Refer Chapter 4)

Module 4

Data Converters :

Analog to Digital : Performance parameters, Simple ramp, Dual slop, Successive approximation and Flash ADC. **Digital to Analog :** - Performance parameters, Binary weighted and R/2R ladder.

(Refer Chapter 5)

Module 5

Special Purpose Integrated Circuits :

Monolithic Timer : NE555, functional block diagram, working, design and applications. Functional block diagram, Working and Applications : Voltage controlled oscillator 566, PLL 565, Function generator XR 2206, Power amplifier LM 380.

(Refer Chapter 6)

Module 6

Voltage Regulators :

Functional block diagram of Voltage Regulators, Design of fixed voltage Regulators (78XX and 79XX), three terminal adjustable voltage regulators (LM 317 and LM 337). Functional block diagram, Working and design of IC 723 with current limit and current foldback protection, Switching regulator topologies.

(Refer Chapter 7)

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