

# NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	B. Tech.in Electronics and Instrumentation Engineering
Semester:	IV
Course Code:	2EI603
Course Title:	Electronic Circuits
Course Type:	Core
Year of Introduction:	2023-24

L	T	Practical component				C
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### Course Learning Outcomes (CLOs):

At the end of the course, students will be able to –

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|---|-------|
| 1. select integrated circuit for an application.  | (BL1) |
| 2. analyse the integrated circuits.               | (BL4) |
| 3. design Operational amplifier based circuits.   | (BL6) |
| 4. build the Operational amplifier based circuit. | (BL6) |

Unit	Syllabus	Teaching Hours: 30 Teaching hours
<b>Unit-I</b>	<b>Introduction to Electronic Circuits</b> Introduction to integrated circuit based various electronic circuits, Various commercially available integrated circuits.	01
<b>Unit-II</b>	<b>Linear Applications of Operational Amplifiers</b> Summing, scaling and averaging amplifier, Voltage follower, Integrator, Differentiator, Differential amplifier, Instrumentation Amplifiers.	06
<b>Unit-III</b>	<b>Non Linear Applications of Operational Amplifiers</b> Exponential amplifier, Voltage to current converter, Current to voltage converter, Comparator, Zero crossing detector, Schmitt trigger, Precision rectifier, Half and full wave rectifier, Active filters, Oscillators , Logarithmic Amplifier.	08
<b>Unit-IV</b>	<b>Timers</b> Astable and monostable operation, applications of 555 timers : Missing Pulse detector, PWM generation, Ramp Generation.	05
<b>Unit-V</b>	<b>Power Supply Design</b> Introduction, Performance parameters, Filtering, Function of a bleeder resistor in filter circuit, Voltage multipliers, Regulated power supply, Switched-mode power supply.	04
<b>Unit-VI</b>	<b>Motor Driver ICs and Converters</b> Basic H-Bridge motor driver, motor driver ICs, Analog-to-Digital converters, Frequency to voltage and voltage to frequency converters, Applications of converters.	06

**Laboratory Work:**

This shall consist of at least 10 practicals based on the above syllabus.

**Suggested Reading:**

1. Michel Jacob, Application and Design with Analog Integrated Circuits, PHI Publication.
2. Walter G. Jung, Op-Amp Applications Handbook, Elsevier Publication.
3. John Webster, The Measurement, Instrumentation and Sensors Handbook, CRC Press.
4. Datasheets of the related Integrated Circuits.
5. Robert Boylestead, Electronic Devices and Circuit Theory , PHI Publication.
6. R.A.Gayakwad, Op amp & Linear Integrated Circuits, Prentice- Hall.

**Suggested List of Experiments (not restricted to the following):  
(Only for Information)**

Hrs.	Title of Experiment	
1.	To implement differential amplifier.	2
2.	To implement op-amp based differentiator circuit	2
3.	To implement op-amp based integrator circuit	2
4.	To implement Voltage to Current and Current to Voltage converter circuits using Op amp.	2
5.	To implement op-amp based Schmitt trigger circuit	2
6.	To implement op-amp based precision rectifier circuit	2
7.	To design an astable multivibrator using 555 timer	2
8.	To design a monostable multivibrator using 555 timer	2
9.	To carry out the load regulation and line regulation analysis for power supply IC.	2
10.	To utilize frequency to voltage converter IC	2
11.	To utilize motor driver IC.	2
12.	To design and demonstrate a simulation project.	4

L = Lecture, T = Tutorial, P = Practical, C = Credit

w.e.f. the academic year 2023 - 24 and onwards

