



SHRI GNANAMBICA DEGREE COLLEGE: MADANAPALLE
(AUTONOMOUS)
SUBJECT: ELECTRONICS- MINOR
COURSE 2: ANALOG AND DIGITAL IC APPLICATIONS
SEMESTER III
(W.E.F.2024-2025)



Hours per week: 4

Credits: 3

Objectives The students will learn:

- To understand the concepts, working principles and key applications of linear integrated circuits.
- To perform analysis of circuits based on linear integrated circuits.
- To design circuits and systems for particular applications using linear integrated circuits.
- To familiarize with the concepts of designing digital circuits.

Course Outcomes

Upon successful completion of the course, the students will be able to

- Understand the fundamentals and areas of applications for the integrated circuits.
- Analyze important types of integrated circuits.
- Demonstrate the ability to design practical circuits that perform the desired operation.
- Select the appropriate integrated circuit modules to build a given application.

UNIT-I

Combinational Circuits: Multiplexers (2x1, 4x1, 8x1), De-multiplexer (1x2, 1x4, 1x8), Encoders (Decimal to binary, Octal to Binary), decoders (Binary to Decimal)

UNIT-II

Sequential circuits: Flip-Flops: RS FF, Clocked RS FF, JK FF, JK Master-Slave FF, D FF, T-FF., Counters: Asynchronous 4-bit Counter, Synchronous 4-bit Counter, Mod10 Counter, Decade Counter.

UNIT-III

Sequential circuits: Shift Registers: SISO, SIPO, PIPO, PISO, left shift, right shift. AD Converters: Successive approximation network, linear integrating circuits (Single slope and Dual slope). DA Converters: R-2R Ladder, Binary weighted network,

UNIT – IV

OP-AMPS: Definition of Op-Amp, Block diagram of Op-Amp, Ideal Characteristics, Virtual ground, Inverting and Non-inverting configurations, Summing amplifier, Differential Amplifier, Integrator, Differentiator.

UNIT – V

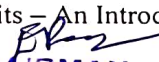
OP-AMPS Applications: Comparator, Ramp generator, Triangular wave generator, Square wave generator, logarithmic Amplifier. Multivibrators - astable, monostable, Bi-stable, Active filters -low pass, high pass, band pass filters.

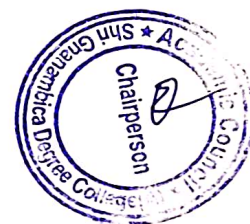
Text Books

1. M.Morris Mano, "Digital Design "3rd Edition, PHI, New Delhi.
2. Ronald J. Tocci. "Digital Systems-Principles and Applications" 6/e. PHI. New Delhi. 1999.(UNITS I to IV)
3. G.K.Kharate-Digital electronics-oxford university press
4. S.Salivahana & S. Arivazhagan-Digital circuits and design
5. Fundamentals of Digital Circuits by Anand Kumar
6. M. Morris Mano, Michael D Ciletti, "Digital Design", 5th edition, PEA.
7. Op Amp and Linear Integrated Circuits By Ramakant Gaykwad
8. Linear Integrated Circuits By Roy Choudary

Reference Books

1. Leach, Malvino, Saha, "Digital Principles and Applications", 7th edition, TMH.
2. Roth, "Fundamentals of Logic Design", 5th edition, Cengage.
3. Jacob Millan ,Micro Electronics,McGraw Hill.
4. Mithal G K, Electronic Devices and Circuits Thana Publishers.
5. Allan Motter shead ,Electronic Devices and Circuits – An Introduction- Prentice Hall


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PRACTICALS
SEMESTER III
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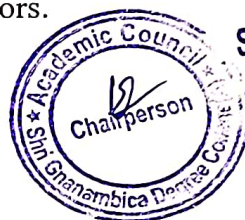
Hours per week: 2

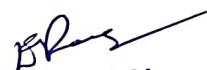
Credits: 1

List of Experiments

The laboratory work can be done by using physical gates and necessary equipment or simulators.
Simulators: <https://sourceforge.net/projects/gatesim/> or <https://circuitverse.org/> or any free open-source simulator

1. Verify the truth table Multiplexer and demultiplexer.
2. Verify the truth table Encoder and decoder.
3. Verify the truth table of RS, JK, T-F/F using NAND gates
4. Verify the truth table of Mod-16 Counter.
5. Verify the truth table Decade counter using IC 7490.
6. 4-bit binary parallel adder and subtractor using IC 7483
7. Op-Amp as inverting and non-inverting
8. Op-Amp as integrator and differentiator
9. Op-Amp as adder & subtractor
10. Op-Amp as square wave generator.
11. Op-Amp Astable and Monostable Multivibrators.




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Model Question Paper

Time: 3hrs

Max. Marks: 70

SECTION A

ANSWER ANY FOUR OF THE FOLLOWING

5x4=20 Marks

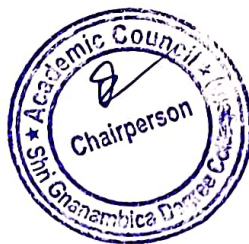
- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION B

ANSWER THE FOLLOWING CHOOSING ONE FROM EACH UNIT

10x5=50 Marks

9. A)
 OR
 B)
10. A)
 OR
 B)
11. A)
 OR
 B)
12. A)
 OR
 B)
13. A)
 OR
 B)




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