

Nirma University
School of Technology, Institute of Technology
Instrumentation & Control Engineering

B. TECH. SEMESTER -III

L	T	P	C
3	0	2	4

Course Code **2IC303**

Course Title **Basic Electronics**

Course Learning Outcome:

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

- analyze analog circuits
- design and analyze the sequential logic circuits
- evaluate the performance of various electronic circuits

Syllabus

**Teaching
Hours**

UNIT 1: Introduction to Analog & Digital electronics

1

UNIT 2: Field Effect Transistors (FET):

12

Construction and characteristics of BJT, FET and MOSFET with their applications, MOSFETs for the digital IC fabrication, CMOS.

UNIT 3: Operational Amplifier

3

Fundamentals of operational amplifier, Feedback configurations of operational amplifiers, Op-amp parameters.

UNIT 4: Optoelectronic Devices

5

Overview of Photonics, Different Optoelectronic Devices.

UNIT 5: Sequential Logic Circuits

12

Classification of sequential circuits, Flip-flops, triggering of Flip-flops, conversion of flip-flops, Analysis of clocked sequential circuits. State reduction and assignments Flip-flop excitation tables. Design procedure, Design of counters, and design with state equations.

UNIT 6 : Registers, Counters and Memory Unit

9

Registers, shift registers, ripple counters, synchronous counters, timing sequences, memory unit.

UNIT 7: Algorithmic State Machines

3

Components of ASM chart, Features of ASM chart. Examples of ASM chart.

Self Study:

The self study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self study contents.

Laboratory Work:

Laboratory work will consist of minimum 12 experiments based on the above syllabus.

References:

- (1) Robert Boylestad, Electronic devices and circuit theory, Pearson Education.
- (2) R.A.Gayakwad, Op amp & Linear Integrated Circuits, Prentice- Hall.
- (3) Millman-Halkias, Integrated Electronics- Analog and Digital circuits and systems, Mc-Graw Hill.
- (4) M. Morris Mano, Digital Logic and Computer design, PHI publication.
- (5) Norman Balabanian and Bradley Carlson, Digital Logic Design Principles, Wiley Student Edition.
- (6) Biswanath Paul, Industrial Electronics and Control, Prentice Hall India.