II B.Tech – II Semester (17EC405) PULSE AND DIGITAL CIRCUITS

Int. Marks	Ext. Marks	Total Marks		L	Т	Р	С
40	60	100		3	1	-	3

Pre-Requisites: Electronic Devices and Circuits

Course Objectives:

- To understand the concept of wave shaping circuits, Switching Characteristics of diode and transistor
- To study the design and analysis of various Multivibrators.
- To understand the functioning of different types of time-base Generators.
- To learn the working of logic families & Sampling Gates.

UNIT-I: LINEAR WAVESHAPING

High pass, low pass RC circuits, their response forsinusoidal, step, pulse, square, ramp and exponential inputs. RC network as differentiator and integrator; Attenuators , its applications in CRO probe, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT-II: NON-LINEAR WAVE SHAPING

Diode clippers, Transistor clippers, Diode and Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper; Clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers, comparators, applications of voltage comparators.

UNIT-III: SWITCHING CHARACTERISTICS OF DEVICES

Diode as a switch, piecewiselinear diode characteristics, Design and analysis of Transistor as a switch, Break down voltageconsideration of transistor, saturation parameters of Transistor and their variation withtemperature, Design of transistor switch, transistor-switching times, Introduction to Multivibrators. **Bistable Multi vibrator**: Analysis And Design of Fixed Bias, Self Bias Bistable Multi Vibrator, Collector Catching Diodes, Commutating Capacitors, Triggering of Binary Circuits, Emitter Coupled Bistable Multivibrator (Schmitt Trigger).

UNIT-IV: MONOSTABLE MULTIVIBRATOR & ASTABLE MULTIVIBRATOR

Monostable Multivibrator: Analysis and Design of Collector Coupled Monostable Multi vibrator, Triggering of Monostable Multi vibrator, Applications of Monostable Multivibrator.

Astable Multivibrator: Analysis and Design of Collector Coupled As table Multivibrator, Application of As table Multivibrator as a Voltage to Frequency Converter.

UNIT-V: VOLTAGE TIME BASE GENERATORS

General features of a time base signal, Methods of generating time base waveform Exponential Sweep Circuits, Negative Resistance Switches, basic principles in Miller and Bootstrap time base generators, Transistor Miller time base generator, Transistor Bootstrap time base generator, Principles of synchronization,

UNIT-VI: LOGIC FAMILIES & SAMPLING GATES

LOGIC FAMILIES: Diode Logic, Transistor Logic, Diode-Transistor Logic, Transistor-Transistor Logic, Emitter Coupled Logic, AOI Logic, Comparison of Logic Families.

SAMPLING GATES: Basic Operating Principles of Sampling Gates, Diode Unidirectional Sampling Gate and Two-Diode Bi-Directional Sampling Gate, Four-Diode gates, Six-Diode Gates, Reduction of Pedestal in Sampling Gates, Applications of Sampling Gates.

Course Outcomes:

After successful completion of the course, the students can be able to:

S. No	Course Outcome	BTL
1.	Understand and Design Analysis of linear wave shaping circuits	L2
2.	Understand and Design Analysis of Non-linear wave shaping circuits	L2
3.	Understand various switching Devices such as Diodes and Transistors	L3
4.	Analyze and Design different multi vibrator circuits	L3
5.	Analyze and design different time base generator circuits	L3
6.	Design Logic gates and Sampling gates using discrete components	L2

Correlation of COs with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	1	3	-	2	-	-	-	1	3	-	-	3	1
CO 2	3	1	3	-	2	-	-	-	1	3	-	-	3	1
CO 3	3	2	3	-	2	-	-	-	2	3	-	-	3	1
CO 4	3	3	3	-	2	-	-	-	3	3	-	-	3	2
CO 5	3	2	3	-	2	-	-	-	3	3	-	-	3	2
CO 6	3	2	3	-	2	-	-	-	2	3	-	-	3	2

Text Books:

- 1. Pulse, Digital and Switching Waveforms J. Millman and H. Taub, McGraw-Hill
- 2. Pulse and Digital Circuits A. Anand Kumar, PHI, 2005

Reference Books:

- 1. Pulse, Digital and Switching Waveforms J. Millman and H. Taub, Mothiki S Prakash Rao McGraw-Hill, Second Edition, 2007.
- 2. Solid State Pulse circuits David A. Bell, PHI, 4th Edn., 2002
- 3. Pulse & Digital Circuits by Venkata Rao, K, Ramasudha K, Manmadha Rao, G., Pears