



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

KAKINADA-533003, Andhra Pradesh, India

R-13 Syllabus for ECEJNTUK

III Year-I Semester	Pulse & Digital Circuits(RT31041)	T	P	C
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Prerequisite Course:

EDC

Course Description and Objectives:

This course provides the knowledge on designing of various wave shaping circuits, Multivibrators & Time base generators. To understand Switching Characteristics of diode and transistor, Sampling Gates and to Design NAND and NOR gates using various logic families.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes.

Cos	Course Outcomes	POs
1	Design linear and non-linear wave shaping circuits.	3
2	Apply the fundamental concepts of wave shaping for various switching and	3
3	Design different multivibrators and time base generators.	3
4	Utilize the non sinusoidal signals in many experimental research areas	2

Syllabus:

UNIT I:

Objective: To understand the concept of Linear wave shaping circuits

LINEAR WAVE SHAPING: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp 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:

Objective: To understand the concept of Non-Linear wave shaping circuits

NON-LINEAR WAVE SHAPING : Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode

UNIT III:

Objective: To understand the Switching Characteristics of diode and transistor & To Understand the Designing of NAND and NOR gates using various logic families.

SWITCHING CHARACTERISTICS OF DEVICES : Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor- switching times.

Digital Logic gate circuits: Realization of Logic Gates using DTL, TTL, ECL and CMOS logic circuits, Comparison of logic families.

UNIT IV:

Objective: To analyze different types of Multi vibrators and their design procedures

Biastable Multi Vibrator: Analysis and Design of Fixed bias ,Self bias biastable multivibrator,Collector catching diodes,Commutating capacitors,Methods of Triggering using RC network & Diode, Emitter Coupled Bistable Multi Vibrator (Schmitt trigger).

Monostable Multi Vibrator: Analysis and Design of Collector Coupled Monostable Multi Vibrator, Triggering method of a Monostable Multi Vibrator, Application of Monostable Multi Vibrator as a Voltage to Time Converter.

Astable Multi Vibrator: Analysis and Design of Collector Coupled Astable Multi vibrator , Application of Astable Multi Vibrator as a Voltage to Frequency Converter. All circuits are transistor version.

UNIT V:

Objective: To Introduce to Time-base Generators and Principles of Synchronization and Frequency division.

VOLTAGE TIME BASE GENERATORS : General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator.

UNIT VI:

Objective: To Understand Sampling Gates

SYNCHRONIZATION AND FREQUENCY DIVISION & SAMPLING

GATES : Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals.

Basic operating principles of sampling gates, Unidirectional and Bi- directional sampling gates, Reduction of pedestal in gate circuits, Applications of sampling gates.

TEXT BOOKS:

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill, 1991.
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002 .

REFERENCE BOOKS:

1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Wave Generation and Shaping - L. Strauss.
3. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.