

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**II YEAR B.TECH ECE II-SEM L T/P/D C**

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**(A40415) PULSE AND DIGITAL CIRCUITS**

**UNIT I - 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 - NON-LINEAR WAVE SHAPING :** Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, applications of voltage comparators. Clamping operation, clamping circuit taking Source and Diode resistances into account, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, synchronized clamping.

**UNIT III - 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, Silicon-controlled-switch circuits, Sampling Gates: Basic Operating principles of Sampling Gates, Four Diode Sampling Gate, Unidirectional and Bi-directional Sampling Gates, four Diode Sampling Gate, Reduction of pedestal in Gate Circuits.

**UNIT IV - MULTIVIBRATORS:** Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors,  
**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, Current time base generators, Methods of linearity and improvement.

**UNIT V - SYNCHRONIZATION AND FREQUENCY DIVISION:** Pulse of Synchronization of relaxation devices, stability of relaxation devices , Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit, A sinusoidal divider using regeneration and modulation.

**REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS :**

AND, OR and NOT gates using Diodes and transistors, DCTL, RTL, DTL, TTL and CML logic families and its comparison.

**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

**REFERENCES**

1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Fundamentals of pulse and digital circuits-Ronald.J.Tocci,3 ed. ,2008
3. Pulse and Digital Circuits-Motheke S.Prakash rao,2006,TMH
4. Wave Generation and Shaping - L. Strauss.

**Outcomes:**

At the end of the course, the student will be able to:

- Understand the applications of diode as integrator, differentiator, clippers, clamper circuits.
- Learn various switching devices such as diode, transistor, SCR.
- Difference between logic gates and sampling gates.
- Design mutivibrators for various applications, synchronization techniques and sweep circuits.
- Realizing logic gates using diodes and transistors.