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| **ECX514** | **Pulse and Digital Switching Waveform** | **L-T-P: 3-0-0; Total 42 Lectures** |

**Prerequisite**

* Elements of Electronics Engineering,

**COURSE OBJECTIVE**

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**COURSE CONTENT**

**Unit1: Linear Wave Shaping:**

High Pass and Low Pass RC Circuits and their Response for Sinusoidal, Step Voltage, Pulse, Square Wave and Ramp Inputs. High Pass RC Circuit as a Differentiator.  Low Pass RC Circuit as an Integrator. Attenuators and their Application as 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. Comparator – Applications of voltage Comparators – Diode Comparator. Clamping Operation. Clamping Circuits using Diode with Different Inputs.  Clamping Circuit Theorem. Practical Clamping circuits.  Effect of diode Characteristics on Clamping Voltage.

**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.

**Unit IV: Multivibrators:**

Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

**Unit V: 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.

**Unit VI: Synchronization and Frequency Division:**   
Principles of Synchronization – Synchronization of Astable Multivibrators.  Synchronization of Sweep Circuits with Symmetrical Signals.

**Text Books**

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill

2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn.

**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

**COURSE OUTCOMES**

Students would be able to –

CO1: Design different wave shaping circuits

CO2: Design Multi-vibrator

CO3: Design time base generator