

EC/EE-301

PULSE AND DIGITAL CIRCUITS

L T P C
4 - - 3**COURSE OBJECTIVES:**

1. To know the responses of first order RC low pass and high pass filters for standard inputs
2. To know the transfer characteristics of clipping circuits and the response of clamping circuits for sinusoidal and square wave signals.
3. To do the analysis and design of multivibrators using BJTs
4. To know the methods of generating voltage sweep waveforms
5. To know the concepts of TTL, ECL, NMOS and CMOS logic families

COURSE OUTCOMES:**After successful completion of the course, the students are able to**

1. understand the operation of HP & LP RC circuits, clipping, clamping circuits, Multi vibrators with BJTs, time base generating circuits and ICs digital logic circuits.
2. analyze the response of linear, non-linear wave shaping circuits, multivibrators, and time base generating circuits.
3. design clipper and clamper circuits, sweep circuit, and logic gates using logic families.
4. design the logic gates with TTL, ECL, NMOS and CMOS logic families.
5. Solve Engineering problems pertaining to pulse and digital circuits.

UNIT I*Text Book - 1 (12)*

LINEAR WAVE SHAPING : Responses of RC-high pass circuit and low pass circuits to sinusoidal, step, pulse, square, ramp and exponential inputs, Criteria for good differentiation and integration, uncompensated and compensated attenuators, RLC circuits and their response for step input, ringing circuit.

UNIT II*Text Book - 1 (10)*

NON-LINEAR WAVE SHAPING : Clipping circuits with diodes, clipping at two independent levels, transfer characteristics of clippers, multi-diode circuits, transient and steady state response of a diode clamping circuit, clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, transfer characteristics of clampers.

UNIT III*Text Book - 1 (15)*

MULTIVIBRATORS (using BJTs) : Bistable Multivibrator: fixed bias transistor binary (only), commutating capacitors, unsymmetrical and symmetrical triggering of binary, schmitt trigger circuit.

UNIT IV*Text Book - 1 (12)*

MULTIVIBRATORS (Contd..) collector coupled monostable and astable multivibrators - operation & design.

SWEEP CIRCUITS : Voltage sweep circuits, deviation from linearity expressed as errors, principles of miller and bootstrap sweep circuits, miller circuit, bootstrap circuit.

UNIT V*Text Book - 2 (12)*

Digital Circuits : Fundamental concepts of digital circuits, cmos logic family, nmos logic family, TTL logic family, emitter coupled logic family

LEARNING RESOURCES:

TEXT BOOK(s):

1. J Millman and H Taub - Pulse Digital and Switching Circuits, TMH, 2003
2. Mark N Horemstein - Microelectronic Circuits and Devices, 2nd Edition, PHI, 1996

REFERENCE BOOK(s):

1. Mothiki S. Prakash Rao, Pulse Digital & Switching Waveforms, 2nd Edition, TMH.
2. Taub and Schilling, Digital Integrated Electronics, Mc-Graw Hill, 1977.

WEB RESOURCES:

1. <http://nptel.ac.in/courses/117106086/>
2. <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-374-analysis-and-design-of-digital-integrated-circuits-fall-2003/>