

SEMESTER III – PAPER VII – INTEGRATED CIRCUITS AND APPLICATIONS

UNIT I: INTEGRATED CIRCUITS:

Fabrication and Characteristics-Integrated circuit technology – Basic monolithic integrated circuits – Epitaxial growth-Masking and etching-Diffusion of impurities-Transistors for monolithic circuits-Monolithic diodes-Integrated resistors, Capacitors and inductors-Monolithic circuit layout-Additional isolation methods, LSI and MSI and the metal-semiconductor contact.

UNIT II: ACTIVE FILTERS AND PRECISION CIRCUITS:

RC active filters using op-amp, VCVS filters state-variable filters, Gyrator, switched capacitor filters, amplifier and instrumentation amplifier.

UNIT III: NONLINEAR ANALOG SYSTEMS

Inverting and non-inverting amplifier – Precision AC/DC converters – Log and antilog amplifier – Log multiplier-Peak detector-Sample and hold-Free running, monostable and bistable multivibrators using op-amp-OP-amp version of Schmitt trigger-Triangular and ramp wave generators.

UNIT IV: LINEAR INTEGRATED CIRCUITS

Basic relationship in op-amp-ideal op-amp-CMRR-Op-amp as inverter, non-inverting amplifier, subtracting amplifier, the summing amplifier, the comparator, the voltage follower, the current sources, the integrator, the differentiator and analog computer.

UNIT V: CHARGE-TRANSFER DEVICES

General Concepts Loss Mechanisms in CCDs – Charge coupled Delay Lines and Filters – Charge coupled Memories – Imaging CCD Arrays – CCD Logic structures – Bucket – Brigade Circuits.

BOOKS FOR STUDY

- 1) Integrated circuits and semiconductor devices, C.Deboo and D.Burrous, McGraw Hill, Singapore, 1989.
- 2) Integrated Electronics, Millman and Halkias, McGraw Hill, Singapore, 1991.
- 3) The Art of Electronics, Paul Horowitz and Winfield Hill, Cambridge University Press, Cambridge, 1989.
- 4) Semiconductor Devices and Integrated Electronics, A.G.Milnes, CBS Publishers and Distributors, Delhi (1987) UNIT V.