

MAHATMA GANDHI UNIVERSITY
Ph.D. COURSE WORK IN ELECTRONICS
COURSE II – ADVANCES IN ELECTRONICS

Unit- I MATERIAL SCIENCE

Band theory of solids, Crystalline and non crystalline states-Inorganic solids-polymers-classification, structure, crystallinity of long chain polymer-crystalline imperfection-free electron theory-super conducting materials-semiconductors-terminology and classification-steps in fabrication of integrated circuits-Dielectric materials-polarization-temperature and frequency effects-Theory of magnetism, Classification of magnetic materials.

Unit – II DIGITAL ELECTRONICS

Signal conditioning and data conversion – Introduction-sample and Hold circuits – Analog Multiplexer and De-multiplexer-D/A converter-types-A/D converter – successive A/D conversion-Flash A/D converter – counter type A/D converter – Dual slope A/D converter – Integrator and differentiator circuits – Electronic analog computation.

Unit III: ADVANCED COMMUNICATION SYSTEMS

Types of Signals – Analog and digital signals-spectrum of signals-Time Division multiplexing-frequency division multiplexing- 3 channel and 12 channel carrier signal-computer communication systems-microwave links; line of sight (LOS) link – Tropospheric links – quadruple diversity systems-satellite communications-choice of orbit FDMA,TDMA,SAPDE-optical communication-modulation and detection-ISDN-Mobile communications.

Unit IV : DIGITAL SIGNAL PROCESSING

Discrete Time signals, LTI Systems – Difference Equation, Impulse Response, Transfer function. Stability, Casuality, Convolution sum, Discrete Time Fourier Transform. DFT and IDFT, FFT, Applications of Digital Signal Processing.

Unit V: VLSI DESIGN

An overview of wafer fabrication-wafer Processing-oxidation-patterning-Diffusion-Ion Implantation-Deposition-silicon Gate NMOS process-CMOS process-N-well-Twin tub-silicon on insulator-CMOS process Enhancement-Inter connect elements

Reference Books

1. V.Raghavan-Material Science and engineering-prentice Hall of India.4th Edition-unit 1
2. Jacob Mill man&Arvin Grabel-Microelectronics-McGraw Hill Publications 2nd Edition-unit II
3. Anokh singh-principles of communication engineering-s.chand&Co. New delhi-unit III
4. JohnG.Proakis and Manolakkis,Digital Signal Processing; Principle, Algorithms and Applications. Prentice Hall of India Pvt.Ltd.2000.
5. Neil H.E. Weste kaamaran Eshraghian-Principles of CMOS VLSI Design Addison Wesley publication 2nd Edition
6. Pucknell Eshraghian-Basic VLSI Design-Prentice Hall Edition.