Department of Electronics & Communication Engineering

EC101 Elements of Electronics Engineering

L-T-P-Cr: 3-1-0-4

Module1. Semiconductor Diodes (6 Lectures)

 Semiconductor materials- intrinsic and extrinsic types  Ideal Diode  Terminal characteristics of diodes: p-n junction under open circuit condition p-n junction under forward bias and reverse bias conditions p-n junction in breakdown region  Diode small signal model  Zener diode and applications  Rectifier Circuits  Clipping and Clamping circuits

Module2. Bipolar Junction Transistors (BJTs) (8 Lectures)

 Physical structure and operation modes  Active region operation of transistor  D.C. analysis of transistor circuits  Transistor as an amplifier  Biasing the BJT: fixed bias, emitter feedback bias, collector feedback bias and voltage divider bias  Basic BJT amplifier configuration: common emitter, common base and common collector amplifiers  Transistor as a switch: cut-off and saturation modes  High frequency model of BJT amplifier

Module 3. Field Effect Transistor (FET) (4 Lectures)

 Enhancement-type MOSFET: structure and physical operation, current-voltage characteristics  Depletion-type MOSFET  D.C. operation of MOSFET circuits  MOSFET as an amplifier  Biasing in MOSFET amplifiers  Basic MOSFET amplifier configuration: common source, common gate and common drain types  High frequency model of MOSFET amplifier  Junction Field-Effect Transistor (JFET)

Module 4. Operation Amplifier (Op-amps) (5 Lectures)  Ideal Op-amp, CMRR and its applications as Differential amplifier  Practical op-amp circuits: inverting amplifier, non -inverting amplifier, weighted summer, integrator, differentiator, Active Filter (2nd Order) Module 5. Logic circuits and Applications (5 Lectures)  Logic gates and circuit,  Logic circuit implementation using diodes and transistors  Combinational logic Circuit  SOP and POS, Minimization Techniques

Module 6. Sequential Circuit (10 Lectures)  Sequential Logic Design: Latches and Flip flops  Flip-flops: RS- FF, JK-FF, D- FF and T- FF  Counters, Multiplexor and De-multiplexor

Module 7. Analog Communication (4 Lectures)  Basics of Communication system (AM, FM, PM)  Demodulation Circuits

Suggested Readings: 1. Nashelesky & Boylestead, “Electronic Devices and Circuit Theory”, PHI/Low price edition. 2. Sedra and Smith, “Microelectronic Circuits”, 3. Millman & Gabrial, “Microelectronics”, McGraw Hill 4. Paul Horowitz and Winfield Hill, “ The Art of Electronics”, Cambridge University Press 5. Morris Mano, Digital Electronics 6. Flecher, Digital System