Course Name - Basic Electronics

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Course Syllabus –

1. Semiconductor Diodes

• 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

2. Bipolar Junction Transistors (BJTs)

• 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

3. Field Effect Transistor (FET)

• 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)

4. Operation Amplifier (Op-amps)

• Ideal Op-amp
• Differential amplifier: differential and common mode operation common mode rejection ratio (CMRR)
• Practical op-amp circuits: inverting amplifier, non -inverting amplifier, weighted summer, integrator, differentiator
• Large signal operation of op-amps
• Other applications of op-amps: instrumentation circuits, active filters, controlled sources, logarithmic amplifiers, waveform generators, Schmitt triggers, comparators

5. Power Circuits and Systems

• Class A large signal amplifiers, second-harmonic distortion
• Transformer coupled audio power amplifier
• Class B amplifier
• Class AB operation
• Power BJTs
• Regulated power supplies
• Series voltage regulator
• Four layer diodes: p-n-p-n characteristics
• Silicon controlled rectifier