

Outline of Lecture #3: Transformers, Diodes and Transistors

- Transformers
 - Primary and secondary windings
 - Faraday's Law and the transformer equation
 - Step-up vs. step-down
- Semiconductors
 - Band structure and band gap
 - Electron-hole pairs
 - Doping: n-type vs. p-type
 - The pn-junction
- Diodes
 - Types of diodes
 - I-V characteristic
 - Forward-bias vs. reverse-bias
 - Temperature effects
 - Breakdown and Zener diodes
 - Rectifier circuits
 - Half-wave rectifier
 - Full-wave rectifier
 - D.C. Power Supplies
 - Filtering and voltage ripple
 - Voltage regulation using Zener diodes
 - Limiting or clamping circuits
- Bipolar Junction Transistors (BJTs)
 - Energy level diagrams – npn vs. pnp
 - Terminals: base, emitter, collector
 - Biasing to get “transistor action”
 - Transistor as a voltage-controlled current valve
 - Current switch
 - Emitter-follower
 - Output impedance and “loading” reviewed
 - Input/output impedance
 - Transistor amplifiers
 - Common-emitter amplifier