Phys 2003	BASIC ELECTRONICS	(CR3)
Preq.	Phys 1201	

Objectives

Course is designed to introduce fundamental principles of circuit theory and electronic devices.

Syllabus

Fundamental Solid-State Principles, Atomic theory, Metals, insulators and semiconductors, Conduction in Silicon and Germanium, doping, The forbidden energy gap, n and p type semiconductors. The Semiconductor Diode: Introduction to pn junction diode, Bias, the ideal diode, the practical diode model, other practical considerations, the complete diode model, voltage-current characteristics. Common Diode applications: Transformers and power supply, Half-wave rectifiers, full-wave rectifiers, full-wave Bridge rectifiers, wave shaping circuits using diode, voltage multiplier circuits. Special applications Diodes: Zener diodes, light emitting diodes, photodiodes, capacitance effects in the pn junction, other diodes. Circuit analysis: DC circuit analysis, single and multi-loop circuits, Kirchhoff's rules, RC circuits, Charging and discharging of a capacitor, RL circuits, AC circuit analysis using the *j*-operator, RLC circuits, superposition theorem, Thevenin's theorem, Norton's theorem, the hybrid parameter equivalent model, graphical depiction of hybrid-parameters, variation of transistor parameters. Bipolar Junction Transistors: Introduction to Bipolar Junction Transistors (BJTs), transistor construction and operation, transistor characteristics curves, conept of

load line. Bipolar Junction Transistors applications: Transistor as an amplifier, basic transistor configurations, transistor as a switch, concept of decibels, Feedback principle and circuits.

Recommended Books

1. *Introductory Electronic Devices and Circuits, by R. T. Paynter, Prentice Hall, 7th edition, (2005).*
2. *Introductory Electric Circuits, by R. T. Paynter, Prentice Hall, (1998).*
3. *Electronic Devices, by T. L. Floyd, Pearson, 10th Edition, (2017)*
4. *Grob's Basic Electronics, by M. E Schultz, McGraw-Hill Education, 12th edition, (2015)*
5. *Introductory Circuit Analysis, by R. L. Boylestad, Pearson, 13th Edition, (2015)*
6. *Electronic Principles, by A. P. Malvino, David J. Bates, McGraw-Hill, 8th Edition, (2015)*