

Our day-to-day life highly depends on electronic devices. Hence, studying electronics has become more important than ever. In this introductory course on electronics, we aim to study about semiconductors and their applications in analog and digital electronics. This course will be taught in a hybrid mode, where there will be both theory classes as well as six laboratory experiments based on the theories taught in the class.

Theory:

- Introduction with semiconductor, P and N type semiconductors, P-N junction diodes, Band structures of P-N junction diode and their applications
- Bi-polar junction transistor (CB, CE, CC modes) and their characteristics. Applications of transistors
- Feedback amplifier, Oscillator, multivibrator
- Filters and RLC circuit
- Operational amplifiers (Op-AMP) and their applications as integrator, differentiator, voltage comparator, rectifier, Schmidt Trigger etc.
- Number system, Boolean algebra, Logic gates, Universal gates, Adders, Flip-flops, counters

Experiment:

- Characteristics of a diode
- Applications of Op-Amp as integrator, differentiator, inverter, Schmidt trigger
- The truth tables of all gates, formation of universal gates by using NAND and NOR, half adder, full adder, half subtractor, Flip-Flop.

References:

1. Integrated Electronics by Millman and Halkias
2. Electronic devices and circuit theory by Boylestad and Nashelsky (for the analog electronics part)
3. Basic Electronics principals and applications by Saha, Halder and Ganguly
4. Electronics by Chatterjee and Rakshit