

**Subject Code:** [Introduction to Electronics] Semester-I [ETC/EEE/CSE/CE/IT] Batch-2019-2023

**Faculty Coordinator:** Dr Sanjeev Kumar Mishra [<https://sites.google.com/site/sanjeevkumarmishra20/home>]

**Course Objective:** To introduce the fundamental aspects of Electronics and Circuits.

1. Enable the students to design circuits using Diodes, BJTs, FETs, and Op-Amps.
2. Enable the students to determine the characteristics of amplifiers such as gain, input/output resistance.
3. Enable the students to analyze oscillator circuits.
4. Enable the students to use simulation software for circuit analysis.

| Module | <u>Syllabus cum Lesson Plan</u>  | No. of Lectures |
|--------|--|-----------------|
| I      | <b>Diodes:</b> Physical operation of PN junction diode [2], Zener diode, and LED [2], Applications of PN junction diode (Rectifiers [2], Clippers [1], Clampers [1]), Applications of Zener diode (Voltage regulators, Clippers), Applications of LED [2].   | 10              |
| II     | <b>Bipolar Junction Transistors (BJTs):</b> Physical operation of BJT: Active, Saturation, and Cut-off operating regions [2], DC biasing [4], Transistor as a switch, $r_E$ Transistor model. [2], CB, CE, CC amplifiers [4].  | 12              |
|        | <b>Field Effect Transistors (JFETs &amp; MOSFETs):</b> Introduction, Physical Design and Operation, Input and output Characteristics. [3hrs]   | 3               |
| III    | <b>Operational Amplifier (Op Amp):</b> Differential amplifier [1], Ideal Op-Amp Characteristics and parameters [1], Feedback concepts, Applications of Op-Amp (Inverting and non-inverting amplifier, Difference amplifier, Summing amplifier, Integrator and Differentiator [3], Oscillator circuits- Wien-Bridge oscillator, RC phase-shift oscillator, Crystal oscillator) [4]. | 9               |
|        | <b>Electronic Instruments:</b> Basic principle and function of Oscilloscope and Function generator, Application of oscilloscope for measurement of voltage, time period, frequency and phase. [2]  | 2               |

| Text Books: -   |  | <u>Evaluation:</u>  |
|---|--|---|
| Electronic Devices and Circuit Theory (Ninth Edition) | Robert L. Boylestad and Louis Nashelsky, Pearson Education | End Semester: 50%,<br>Midterm: 30%, Q1=10%<br>Assignment: 10% |

| Key Points: -  |  |
|--|--|
| <input type="checkbox"/> Coming to the class on time is very essential.  |  |
| <input type="checkbox"/> Clarify your doubts during the lecture or at the very latest immediately after the class. |  |
| Reference Books: -   |  |
| Integrated Electronics: Analog Digital Circuits and Systems  | Jacob Millman, Christos Halkias. McGraw-Hill, Inc., New York, NY, USA 1972 |
| Microelectronic Circuits (Fifth Edition)   | Adel S. Sedra and Kenneth C. Smith,  |
| Electronic Devices (Seventh Edition)   | Thomas L. Floyd, Pearson Education   |