DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EC 1107 **(3Th+1T hrs/week)**

Basic Electronics

Questions to be set : *Eight (Four from each unit). Each question carries 20 marks.*
Questions to be answered : *Any five selecting at least two from each unit.*
Credit : *4 (L-3, T-1, P-0)*

Course Objective: This course introduces students with limited math and science background to the world of electronics, a high-technology field undergoing great expansion in many societies. Through a theoretical and hands-on approach using multitude of electronic components and devices, students explore the fascinating world of electricity and electronics. This captivating program presents electricity, simple active and passive components, semiconductors, working principle of semiconductor devices such as p-n junction diode, Transistor (BJT), introduction to digital electronics as well as introduction to communication.

Pre-requisites: Basic idea on current source, voltage source, 10+2 physics and mathematics, Network theorem, Mess and node analysis.

UNIT- I

1. **Passive Components:** Resistors, Capacitors, Inductors: types and characteristics and their applications.

2. **Semiconductors & PN Junction diodes:** General idea of a PN junction diode, Reverse and forward biased characteristics, Incremental resistance of a forward biased PN junction, Transition, capacitance and diffusion capacitance.

3. **PN Junction diode Applications:** Half wave rectifier, full wave center tapped and bridge rectifier with and without capacitor filter. Clipper and Clamper application.

4. **Special purpose diodes:** Zener diode, Photo diode, Varactor diode, Light emitting diode, Schottky diode, Tunnel diode, Solar Cells.

UNIT—II

1. **Transistors: Biasing & Stabilization:** PNP and NPN transistors. Characteristics of current flow across base region of transistor. Graphical analysis (DC and AC load line), CE, CB, CC Configurations, Biasing and stabilization of Q- point, fixed bias, self bias, collector bias.

2. **Applications of Transistors:** BJT as an amplifier, BJT as a Switch.

3. **Digital electronics:** Introduction of number system, logic gates and its truth table, Boolean algebra, Realization of function using Boolean algebra.

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4. **Introduction to Communication:** Different types of Communication Media (Twisted Pair cable, Co-axial cable, Optical Fiber Cable, Wireless); Introduction to Internet; Modem and its connectivity to a PC for internet browsing.

Text Books:

1. Boylestead and Nashelsky, *Electronic Devices and Circuit Theory*, 10e, Pearson, 2009.
2. R. P. Jain, *Modern digital Electronics*, 4e, Tata McGraw Hill, 2010.
3. Thomas L. Floyd, *Digital fundamentals*, 11e, Pearson Education International, 2015.
4. Alberto Lean, Garcia and Indra Widjaja, *Communication Networks*, 2e, Tata McGraw Hill, 2004.

Reference:

1. S. Salivahanan and N. Suresh Kumar, *Electronic Devices and Circuits*, 3e, Tata McGraw Hill, 2008.
2. M. Morris Mano, *Digital Logic and Computer Design*, 3e, Pearson Education, 2013.
3. Malvino, *Electronic principles*, 7e, McGraw Hill Education (India) Pvt. Ltd., 2014.
4. B.P.Singh, A.Kumar and P. Ranjan, *Basic Electronics*, New Age International, 2017.