

Course Code	Course Name	Course Type	C	L	T	P	Marks		
							Sessional	Final Exam	Total
ESC-101	Basic Electrical and Electronics Engineering	ESC	4	3	1	0	50	100	150

**Course Outcomes**

At the end of the course the student will be able to	
CO1	Learn about applications of network laws and theorems to design electric circuits.
CO2	Examine Sinusoidal waveforms and classify measuring instruments
CO3	Explain the construction and principle of operation of single-phase transformers and DC Machines.
CO4	Understand the characteristics of semiconductor devices and rectifier circuits
CO5	Interpret the principle of various transistor configurations and characteristics.

**Detailed Syllabus****Section-A**

**Unit 1: Elementary Concepts of DC and AC Circuits:** Recent advancements in Electrical Engineering, DC Circuit elements (R, L and C), Voltage and Current sources, Kirchhoff's Current and Voltage laws, mesh and nodal analysis. Superposition, Maximum power transfer, Thevenin and Norton theorems.

**(8 Hrs)**

**Unit 2: Representation of Sinusoidal Waveforms:** Peak and RMS values, Phasor representation, Real power, Reactive power, apparent power, power factor. Analysis of single-phase AC circuits. Classification of Instruments: Operating principle of Measuring Instruments.

**(8 Hrs)**

**Unit 3: Single phase Transformers and Machines:** Principle of operation, ideal and practical transformer, equivalent circuit, losses in transformers, transformer testing, regulation and efficiency, Principle of operation of DC and AC machines.

**(6 Hrs)****Section-B**

**Unit 4: Semiconductor Devices and Applications:** Evolution in Electronics (vacuum tubes to nano-electronics), Types and specifications of Resistor, Inductor, Capacitor and Color coding, PN junction and Zener diode characteristics, Types of diodes (Tunnel diode, Schottky diode, LED, photodiode, Varactor diode), Voltage Regulators, Wave Shaping Circuits (rectifiers, filters, clippers and clampers).

**(8 Hrs)**

**Unit 5: Transistors and Biasing Circuits:** BJT: Principle and operation of NPN transistor, configuration and characteristics (CB, CE, and CC), types of biasing circuit. Hybrid Parameters Introduction. Two port networks, hybrid model for CE, CC, CB configuration and their analysis using h-parameters, Miller theorem. FET: Principle of Operation and characteristics of JFET, biasing of FET, MOSFET and CMOS.

**(10 Hrs)****Text Books**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Basic Electrical Engineering	D. P. Kothari and I. J. Nagrath	Tata McGrawHill	4th (2019)
2	Integrated Electronics	Millman and Halkias	Tata McGraw Hill	4th (2015)

**Reference Books**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Basic Electrical Engineering	A. E. Fitzgerald, David E Higginbotham and Arvin Gabel	Tata McGraw Hill	5th (2009)
2	Electronic Devices and Circuit Theory	Boylstead	Pearson	11th (2015)
3	Electronic Principles	Malvino Leach	Tata McGraw Hill	7th (2017)