**COURSE SYLLABUS**

**GE23211 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING L T P C 3 0 0 3**

**COURSE OBJECTIVES:**

• To introduce the analysis of electric circuits

• To impart knowledge on DC machines and transformers

• To learn the concepts of AC machines

• To introduce analog devices and digital circuits

• To introduce the measurement and instrumentation system

**UNIT I ELECTRICAL CIRCUITS 9**

DC Circuits: Conductor, Resistor, Inductor, Capacitor – Ohm’s Law – Kirchhoff’s Laws –Nodal Analysis, Mesh analysis with Independent sources only (Simple problems only) AC Circuits: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor – Steady state analysis of RLC circuits (Simple problems only).

**UNIT II DC MACHINES AND TRANSFORMERS 9** Construction and Working of DC Motor and Generator – EMF and Torque equation – Circuit Model – Methods of Excitation – Internal and External Characteristics of Generator – Electrical and Mechanical Characteristics of Motor – Starting and Speed Control – Applications Construction and Working of Single-Phase Transformer – EMF equation – Efficiency and Voltage Regulation – Applications.

**UNIT III AC MACHINES 9** Construction and Working of three phase squirrel cage induction motors – Applications – Working of Single phase Induction motors – Double field revolving theory – Starting methods – Applications.

**UNIT IV ELECTRONICS 9** PN Junction and Zener Diodes – BJT, MOSFET, IGBT, SCR – VI Characteristics and Applications – Working of HWR and FWR – Working of Single Phase Full Bridge Inverter – Decimal, Binary, Hexadecimal and Octal systems – BCD – Logic gates.

**UNIT V MEASUREMENTS AND INSTRUMENTATION 9** Measurement system – Standards and calibration – Operating Principle of Moving Coil and Moving Iron meters – CT and PT – DSO – Data Acquisition

TOTAL : 45 PERIODS

**COURSE OUTCOMES:**

At the end of the course, learners will be able to

CO1 : Compute DC and AC circuit parameters

CO2 : Explain the construction, operation and applications of DC machines

CO3 : Explain the construction, operation and applications of AC machines

CO4 : Examine the features of analog electronic devices and develop a combinational logic circuit using Boolean algebra

CO5 : Use a measuring device that is appropriate for the specified measurement.

**TEXT BOOKS**:

1. Kothari DP and I.J Nagrath, “Basic Electrical and Electronics Engineering”, Second Edition, McGraw Hill Education, 2020

2. S. K. Bhattacharya, “Basic Electrical and Electronics Engineering”, Second Edition, Pearson Education, 2017.

**REFERENCES:**

1. Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series, McGraw Hill, 2002.

2. H.S. Kalsi, ‘Electronic Instrumentation’, Tata McGraw-Hill, New Delhi, 2010 3. A.K. Sawhney, Puneet Sawhney ‘A Course in Electrical & Electronic Measurements & Instrumentation’, Dhanpat Rai and Co, 2015.