Branch Specific Courses for Electrical and Electronics Engineering Department

Basic Electrical Engineering

EEEE 102 S1
ECEE 102 S1

	L	T	P	Credit
Scheme	**3**	**0**	**2**	**04**

MAGNETIC CIRCUIT AND ELECTROMAGNETIC INDUCTION (08 Hours)
Amperes circuital law, analogy between electric & magnetic circuits, fringing, leakage, series, parallel, series-parallel circuits, Faradays law, Lenz law, self-inductance, mutual inductance, coefficient of mutual inductance, coefficient of coupling, inductance in series, parallel, series-parallel, Analysis of coupled coils, dot rule, conductively coupled equivalent circuit.

SERIES AND PARALLEL AC CIRCUITS (06 Hours)
Complex algebra and its application to circuit analysis, R-L, R-C, R-L-C series and parallel circuits, series and parallel resonance.

ELECTRICAL NETWORKS ANALYSIS (10 Hours)
Kirchhoff's Voltage Law, Kirchhoff's Current Law, independent and dependent sources, Mesh current and Nodal Voltage analysis, Super position theorem, Thevenin's theorem, Norton's theorem, Reciprocity theorem, Maximum power transfer theorem

POLYPHASE CIRCUITS (06 Hours)
Balanced three phase systems, star and mesh connections, calculations for balanced and unbalanced three phase networks, polyphase vector diagram, and measurement of power in three phase circuits.

SINGLE PHASE TRANSFORMERS (04 Hours)
Principle of transformer, construction - shell type, core type, transformer on no-load, with load, phasor diagram for transformer under no-load and loaded condition (with unity, lagging power factor load) equivalent circuit, open circuit and short circuit test, losses in the transformer, efficiency, voltage regulation.

THREE-PHASE INDUCTION MOTORS (04 Hours)
Rotating magnetic field, types of induction motor, Principle of operation, slip, different power stages, efficiency of the induction motor.

ELECTRIC WIRING AND ILLUMINATION (04 Hours)
Circuits in domestic wiring, simple control circuit in domestic installation, Types of lamps, fixtures & reflectors, illumination schemes for domestic, industrial & commercial premises, Lumen requirements for different categories, working principle of tube light (fluorescent tube) , LED.

Total Lecture Hours: 42

List of Practical

1. Power measurement in single phase R-L series circuit.
2. Power measurement in single phase R-C series circuit.
3. To study the working principle of tube light and fan.
4. Hysteresis loop on CRO.
5. Study the different types of wiring in electrical engineering.
6. Determination of single phase transformer equivalent circuit parameters using open-circuit and short circuit test.
7. Load test on single phase transformer.
8. Three phase power measurement using two wattmeter method.
9. Star- delta connection of three phase circuit.

BOOKS RECOMMENDED:

1. V. N. Mittle and Arvind Mittal, “Basic Electrical Engineering”, 2nd edition, Tata McGraw-Hill Education 2005.
2. Edminister Joseph A., “Electrical circuits”, Schaum’s outline series, McGraw hill, 2nd edition, 1983
3. B. L. Theraja and A. K. Theraja, “A text book of Electrical Technology: Volume I: Basic Electrical Engineering”, S. Chand, 2013.
4. Kothari Nagrath, “ Basic Electrical Engineering”, 2nd edition, Tata McGraw-Hill Education 2007.
5. A. chakrabarti, M. L. Soni, P.V. Gupta, U. S. Bhatnagar, “Power System Engineering”, Dhanpatrai & Co., Second edition, 2013.
6. A.Chakrabarti, “ Circuit Theory”, Dhanpat Rai & Co. , Sixth edition, 2012

Electronic Devices and Circuits

EEEC 113 S2
ECEC 113 S2

	L	T	P	Credit
Scheme	**3**	**0**	**2**	**04**

- **SEMICONDUCTOR DIODES AND APPLICATIONS (10 Hours)**
  Quantitative theory of pn diode, volt-ampere characteristics and its temperature dependence, narrow- base diode, transition and diffusion capacitance of p-n junction diodes, breakdown of junctions on reverse bias, small signal models of diode, PN diode Application as Rectifier, Half Wave Rectifier, Center Tap and Bridge Rectifier, Filter circuits, C, LC and pie filter with circuit Diagram and waveforms.
  Zener Diode theory, Construcion, Operation with forward and reverse VI characteristics, Zener Voltage Regulator, construction and application of Schottkey and Varactor Diodes.

- **BIPOLAR JUNCTION TRANSISTOR ANALYSIS AND DESIGN (08 Hours)**
  Introduction to BJT, IV characteristics, Analysis of CE Configuration: Current Amplification in the Transistor Circuits, Power Calculations, Bypass Capacitor, Coupling Capacitors, concept of AC and DC Load Lines, Different DC Biasing Methods, Fixed Bias, Emitter Stabilized Bias, Potential Divider Bias, DC Bias with voltage Feedback, Common Base Configuration Analysis, Emitter follower, Charge Storage and transient response, small signal models of BJT, Ebers-Moll Model of BJT.

- **FIELD EFFECT TRANSISTOR CIRCUITS (08 Hours)**
  Introduction to FET, Bias stability in FET, Different FET Configuration, Analysis of CS, CG and CD Configuration, Voltage Biasing Techniques, Common Source Amplifier, MOS capacitor, Depletion Mode and Inversion, MOSFET Operation and Enhancement Mode of MOSFET, Transfer Characteristics.

- **SMALL SIGNAL LOW FREQUENCY ANALYSIS AND DESIGN (08 Hours)**
  Hybrid Parameters, CE Configurations, CB Configurations, CS Configurations, CD Configuration, Impedance Reflections, Phase Splitter.

- **DEVICES USED FOR POWER ELECTRONICS (08 Hours)**
  Diac,UJT, SCR, Triac, Power MOSFET and IGBT,

(Total Lecture Hours: 42)

PRACTICALS

1. Diode Characteristic
2. Rectifiers and Filters
3. Zener as a voltage Regulator
4. BJT Characteristics
5. BJT Biasing Methods
6. FET Characteristics
7. FET Biasing Methods
8. MOSFET Inverter
9. Common Emitter Amplifier
10. Common Source Amplifier
11. SPICE Modeling of Diode, BJT and MOSFET
12. MINI - PROJECT

BOOKS RECOMMENDED

1. Schilling Donald L. and Belove E., "Electronics Circuits- Discrete and Integrated", McGraw-Hill, 3rd Ed., 1989, Reprint 2008
2. Boylestad Robert L. and Nashlesky Louis, "Electronics Device & Circuits Theory", PHI, 10th Ed., 2009
3. Millman Jacob, Halkias Christos C. and Parikh C., "Integrated Electronics", McGraw-Hill, 2nd Ed., 2009
4. D. A. Neamen, Semiconductor Physics and Devices (IRWIN), Times Mirror High Education Group, Chicago) 1997
5. J. Milman and A. Grabel, Microelectronics, McGraw Hill, International, 1987. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991