mit the marks list along with the solution (sketches) on graph sheets computer printouts in separate covers.

Each batch must consist of a minimum of 10 students and a maximum of 12 students.

Examination can be conducted in parallel batches, if necessary.

t Books :

N.D.Bhatt & V.M.Panchal, **"Engineering Drawing"**, 48th edition, 2005-Charotar Publishing House, Gujarat.

erence Books :

S. Trymbaka Murthy, **"Computer Aided Engineering Drawing"**, Universities Press(India) Pvt. Ltd., Hyderabad, 4th Edition.

K.R. Gopalakrishna, **"Engineering Graphics"**, 32nd edition, Subash Publishers Bangalore, 2005.

Luzadder Warren J., Duff John M., **"Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production"**, Eastern Economy Edition, Prentice-Hall of India Pvt. Ltd., New Delhi, 2005.

Prof. M. H. Annaiah, **"Computer Aided Engineering drawing"** New Age International Publisher, New Delhi. 2009.

e :

tware Packages : Students should be taught and make familier with tware packages such as, Autodesk Auto CAD 2014 (Freely nloadable). Solid Works or other similar packages

BASIC ELECTRICAL ENGINEERING

Subject Code :	**14ELE15/14ELE25**	**IA Marks**	**:25**
Hours/Week :	**04**	**Exam. Hours**	**:03**
Total Hours :	**50**	**Exam. Marks**	**:100**

Course Objectives :

- Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- Provide working knowledge for the analysis of basic D.C. and A.C. circuits used in electrical and electronic devices.
- Develop selection skill to identify the type of generators or motors required for particular application.
- Highlight the importance of transformers in transmission and distribution of electric power.
- Emphasize the effects of electric shock and precautionary measures.
- Improve the ability to function on multi-disciplinary teams.

Module – 1

1a. D.C.Circuits : Ohm's Law and Kirchhoff's Laws, analysis of series, parallel and series- parallel circuits excited by independent voltage sources. Power and Energy. Illustrative examples.

1b. Electromagnetism : Review of field around a conductor, coil, magnetic flux and flux density, magnetomotive force and magnetic field intensity, reluctance and permeability, definition of magnetic circuit and basic analogy between electric and magnetic circuits. **5 Hours**

Electromagnetic induction : Definition of Electromagnetic Induction, Faradays Laws, Fleming's right hand rule, Lenz's Law, Statically and dynamically induced emf. Concept of self-inductance, mutual inductance and coefficient of coupling. Energy stored in magnetic field. Illustrative examples. Force on current carrying conductor placed in a magnetic field, Fleming's left hand rule. **5 Hours**

Module – 2

2a. D.C.Machines : Working principle of D.C.Machine as a generator and a motor. Types and constructional features. Types of armature windings, Emf equation of generator, relation between induced emf and

ninal voltage with an enumeration of brush contact drop and drop due ırmature reaction. Illustrative examples, neglecting armature reaction. ɜration of D.C. motor, Back emf and its significance, torque equation. ɛs of D.C. motors, characteristics and applications. Necessity of a starter D.C. motor. Illustrative examples on back emf and torque. **7 Hours**

Measuring Instruments : Construction and Principle of operation of ıamometer type wattmeterand single phase induction type energy meter. **3 Hours**

Module – 3

Single-phase A.C. Circuits : Generation of sinusoidal voltage, frequency ɜenerated voltage, definition and numerical values of average value, t mean square value, form factor and peak factor of sinusoidally ying voltage and current, phasor representation of alternating quantities. ılysis, with phasor diagrams, of R, L, C, R-L, R-C and R-L-C circuits , parallel and series- parallel circuits. Real power, reactive power, apparent ver and power factor. Illustrative examples. **7 Hours**

Domestic Wiring : Service mains, meter board and distribution board. ef discussion on concealed conduit wiring. Two-way and three-way trol. Elementary discussion on Circuit protective devices: fuse and ıiature Circuit Breaker (MCB's). Electric shock, precautions against shock ırthing, Earth leakage circuit breaker (ELCB) and Residual current circuit ıker (RCCB). **3 Hours**

Module – 4

Three Phase Circuits : Necessity and advantages of three phase tems, generation of three phase power. Definition of Phase sequence, ınced supply and balanced load. Relationship between line and phase ues of balanced star and delta connections. Power in balanced three- ıse circuits, measurement of power by two-wattmeter method. ermination power factor using wattmeter readings. Illustrative examples. **6 Hours**

Three PhaseSynchronous Generators : Principle of operation, Types . constructional features, Advantages of rotating field type alternator, ıchronous speed, Frequency of generated voltage,Emf equation. Concept winding factor (excluding the derivation of distribution and pitch factors). strative examples on emf equation. **4 Hours**

Module – 5

5a. Single Phase Transformers : Necessity of transformer, Principle of operation and construction of single-phase transformers (core and shell types). Emf equation, losses, variation losses with respect to load, efficiency, Condition for maximum efficiency, Voltage regulation and its significance (Open Circuit and Short circuit tests, equivalent circuit and phasor diagrams are excluded). Illustrative problems on emf equation and efficiency only. **6 Hours**

5b. Three Phase Induction Motors : Principle of operation, Concept and production of rotating magnetic field, Synchronous speed, rotor speed, Slip, Frequency of the rotor induced emf, Types and Constructional features. Slip and its significance. Applications of squirrel - cage and slip - ring motors. Necessity of a starter, starting of motor using stars-delta starter. Illustrative examples on slip calculations. **4 Hours**

Course Outcomes :

After studying this course, students will be able to:

- Understand electrical circuit concepts
- Understand electromagnetic and electromagnetic induction
- Understand DC Machines
- Understand single and three phase circuits, and
- Understand generators and motors.

Scheme of examination :

- **Two full questions (with a maximum of four sub questions) of twenty marks each to be set from each module. Each question should cover all contents of the respective module.**
- **Students have to answer five full questions choosing one full question from each module**

Text Books :

1. D.C. Kulshreshtha, **"Basic Electrical Engineering"**, TMH, Revised First Edition.
2. E.Hughes, **"Electrical Technology"**, International Students 9th Edition, Pearson, 2005.
3. Rajendra Prasad, **"Fundamentals of Electrical Engineering"**, PHI, Third Edition, 2014.

erence Books :

AbhijitChakrabarti, Chandan Kumar Chanda, Sudiptanath, **"Basic Electrical Engineering"**, TMH, First Edition.

B.L.Theraja, **"Fundamentals of Electrical Engineering and Electronics"**, S.Chand & Company Ltd, Reprint Edition 2013.

BASIC ELECTRONICS

Sub Code	:	**14ELN15 / 14ELN25**	**IA Marks**	:	**25**
Hrs/ Week	:	**04**	**Exam. Hours**	:	**03**
Total Hrs.	:	**50**	**Exam. Marks**	:	**100**

Course Objectives :

The course objective is to make students of all the branches of Engineering to understand the efficacy of Electronic principles which are pervasive in engineering applications.

Module – 1

Semiconductor Diodes and Applications (Text-1) : p-n junction diode, Characteristics and Parameters, Diode approximations, DC load line analysis, Half-wave rectifier, Two-diode Full-wave rectifier, Bridge rectifier, Capacitor filter circuit, Zener diode voltage regulators: Regulator circuit with no load, Loaded Regulator, Series and Shunt diode Clipping Circuits, Clamping Circuits: Negative and Positive Clamping Circuits, Numerical examples as applicable. **6 Hours**

Bipolar Junction Transistors : BJT operation, BJT Voltages and Currents, BJT amplification, Common Base, Common Emitter and Common Collector Characteristics, Numerical examples as applicable. **4 Hours**

Module – 2

BJT Biasing (Text-1) : DC Load line and Bias Point, Base Bias, Voltage divider Bias, Numerical examples as applicable. **4 Hours**

Introduction to Operational Amplifiers (Text-2) : Ideal OPAMP, Inverting and Non Inverting OPAMP circuits, OPAMP applications: voltage follower, addition, subtraction, integration, differentiation; Numerical examples as applicable. **6 Hours**

Module – 3

Digital Electronics (Text-2) : Introduction, Switching and Logic Levels, Digital Waveform (Sections 9.1to 9.3). Number Systems: Decimal Number System, Binary Number System, Converting Decimal to Binary, Hexadecimal