

**B.TECH ELECTRICAL ENGINEERING SYLLABUS  
III SEMESTER**

**ENGINEERING GRAPHICS**

**Subject Code: E 201**

**UNIT-I**

Introduction to general purpose graphics software, AutoCAD, plotting techniques, coordinate systems, line drawings, polygon and circle generation, drawing entity commands of computer drafting. Sectional and dimensional drawing using computer.

**UNIT-II**

Conventional Symbols and brief introduction to electrical equipments and electronic devices, measuring instruments, parts of MI and MC instruments.

**UNIT-III**

Sectional drawing of different types of Cables, overhead conductors, wiring systems, domestic, staircase and godown wiring, wiring installation in small residences.

**UNIT-IV**

Mounting and types of enclosures for electric motors , types of transformer and their parts, core construction, sectional view of 1-phase and 3-phase transformers, H.T and L.T windings.

DC machine and its parts, construction of pole, yoke and field coils, commutator and its details.

**UNIT-V**

Sketches of transmission line structures, types of towers, insulating equipments, single line diagram of power substation.

**Reference Books:**

1. Electrical Drawing -K.L.Narang
2. Engineering Drawing - N.D.Bhatt
3. Engineering Drawing with AutoCAD - T.Jayapoorva
4. Electrical Engineering Drawing (Part I & II) - Surjit singh

## **INSTRUMENTATION-I**

**Subject Code: E-202**

### **UNIT I**

Indicating Instruments - Basic elements of instrumentation, purpose of instrumentation, Sources of errors, their effects and analysis. Different methods of producing deflecting, controlling and damping torques. Torque equations, principle and operation of ammeters, voltmeters and wattmeters, moving iron and moving coil, dynamometer. Induction & electrostatic type of instruments. Extension of instrument range.

### **UNIT II**

Detectors And Potentiometers -Theory and operation of ballistic , D'Arsonval, vibration and spot galvanometers, flux meter, standard d.c. & a.c. potentiometers, construction and application of polar and coordinate type potentiometers.

### **UNIT III**

Measurement of Phase and Frequency -Power frequency meters; vibrating reed and resonance types frequency meters. Ohm-meters, Megger and Ratio meters, CRO.

### **UNIT IV**

Measurement of Energy- A.C. single phase and poly-phase induction type energy meters, errors in & methods of minimization, testing of energy meters by direct and phantom loading, maximum demand indicator, tri-vector meter, static energy meters.

### **UNIT V**

Magnetic Measurements -B-H curve, determination of hysteresis loop by method of reversals and point by point method, permeameters, Lloyd -Fischer square for measurement of Iron losses.

#### **Reference Books :**

1. Electrical Measurement & Measuring Instruments - E.W.Golding
2. Electrical Measurement - A.K.Sawhney, Dhanpat Rai & Sons Publication
3. A Course in Electronic and Electrical Measurements & Instrumentation - J.B.Gupta
4. Electrical Measurement & Measuring Instruments – Suryanarayan
5. Electrical & Electronics Measurement & Instrumentation – Umesh Sinha
6. Basic Electrical Measurement – M.B.Stout

# **NETWORKS**

## **Subject Code: E-203**

### **UNIT I**

Circuit Concept –RLC parameters, voltage and current source, source transformation, voltage/current relationship for individual element, mutual inductance, Network Topology : Graph, Tree, Co-tree, incidence matrix, reduced incidence matrix, tie-set, cut-set, loop impedance matrix, node admittance matrix, branch impedance/admittance matrix, formulation of equilibrium equation based on loop/node basis, duality.

### **UNIT II**

Steady State Analysis - Step function response to RL, RC network and concept of time constant. Initial conditions in networks. Laplace transform method, basic theorems of Laplace transform. Waveform synthesis using step functions. Transform of pulse and periodic functions, concept of convolution integral.

### **UNIT III**

Transient Analysis-Poles & zeros of transfer function, one and two port networks, various two port network parameters, Interconnections of two port network, Network theorems : Superposition, Millman, Thevenin's, Norton's & Maximum power transfer theorems.

### **UNIT IV**

Frequency Domain Analysis - Sinusoidal steady state analysis, phasors and phasor diagram, Fourier series, expansion of Fourier series, phase and amplitude spectrum, exponential form, Fourier integral & transforms. Relationship between Laplace & Fourier transforms.

### **UNIT V**

Coupled Circuits - Inductively coupled circuits, coefficient of coupling, frequency response of coupled circuits, single and double tuned circuit resonance.  
Introduction to network synthesis. Driving point & transfer impedance, Positive real function. Foster form & Cauer form of RC, RL & LC networks. Conditions for realizing an immittance function of passive elements.

### **Reference Books:**

1. Network Analysis -Van Valkenberg
2. Network Theory - Roy Choudhary
3. Engineering Network Analysis & Filter Design – Gopal G. Bhise et. al.
4. Network Synthesis – Van Valkenberg
5. Network Analysis and Synthesis - Kuo

# **ELECTROMECHANICAL ENERGY CONVERSION I - (EMEC-I)**

**Subject Code: E-204**

## **UNIT I**

Introduction, Energy in electromagnetic system, Flow of energy in electromechanical devices, Energy in magnetic field and co-energy, Dynamics of electromechanical system, Singly excited systems, Torque and emf equations.

## **UNIT II**

D.C. Generators-Emf equations, Armature windings, Armature reaction, Armature MMF, Interpoles and compensating windings, commutation, characteristics of D.C. generators.

## **UNIT III**

DC motors- Torque equation, characteristics, Starting of D.C. motors, speed control of D.C. shunt motor, braking of D.C. motors, Losses & Efficiency of D.C. machine, Testing of D.C. machine.

## **UNIT IV**

Polyphase circuits : Advantages in favour of polyphase circuits, Generation of three phase emf, phase sequence, connection of three-phase winding, line and phase quantities in star-connected circuit, line and phase quantities in delta-connected system, power in three-phase systems with balanced load.

## **UNIT V**

Transformer review, transformer tests : polarity test, Sumpner's test, Three phase transformers vector group, 3 to 2 and 6 phase conversion. Three phase bank of single phase transformers, parallel operations of 1 & 3 phase transformers, load division between transformers in parallel.

### **Reference books:**

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| 1. Electrical Machines                   | - P.S.Bhimbra                |
| 2. Performance & design of A.C. Machines | - M.G. Say                   |
| 3. Electrical Machines                   | - Fitzgerald Kingsley Otmans |
| 4. Electrical Machines                   | - Nagrath & Kothari          |
| 5. Basic Electrical Engineering          | - V.N.Mittle & A.Mittal      |