

**EE 343: Advanced Computer Programming**

L T P  
(3 – 1 – 3)  
Theory Marks =100  
Sessional Marks = 50  
Laboratory Marks = 50

**Time = 3 hours**

**1. Introduction to Linux:**

Components and versions, description of files and directories, file operations, general line commands, Batch files, configuring the system, administrative mode of operation.

**2. Review of 1st semester IC course:**

Control structure, decision control structure, case control structure.

**3. File operations:**

Opening a file, File opening modes, Closing a file, Reading data from a file, writing data to a file, EOF.

**4. Functions:**

What is function, passing values between functions, call by value, call by reference,

**5. Arrays and pointers:**

Array definition, array initialization, bound checking, passing an array element to a function, passing an entire array to a function, 2-dimensional array, 3-dimensional array, pointer definition, array of pointers.

**6. Structures:**

Use of structure, Declaration of a structure, accessing structure elements, Storing of structure elements. Array of structures.

**7. Strings:**

Definitions, Standard library string functions *strlen()*, *strcpy()*, *strcat()*, *strcmp()*, 2-dimensional array of characters.

**8. Introduction to Object Oriented Programming:**

**Books:**

1. Let Us C: Yashavant Kanetkar (BPB)

2. Let Us C++ : Yashavant Kanetkar (BPB)
3. Programming in C: E Balaguruswamy (TMG)
4. Programming in C – Gotterfried (TMG)

**EE 342: Electrical Engineering Material & Devices**

L T P  
(3 – 1 – 0)

Theory

Marks =100

Sessional  
Mark

Time =

3 hours

2. **Structure of solids:**

Crystalline state of solids, systems & classes, unit cell and space lattice, BCC, DC structure, Bragg's law, Miller indices, Crystal imperfections, grain boundaries.

3. **Dielectrics :**

(I): Properties of static field. Static dielectric constant, polarization, dielectric constant of mono atomic gases & poly atomic molecules, internal fields in solids & liquids, ferroelectric materials, spontaneous polarization, piezo electricity.

(II) Properties in alternating fields: Frequency dependence of electronic, ionic polarizability, complex dielectric constant, dielectric loss, dipolar relaxation, breakdown in dielectrics. General properties of common dielectrics (Electrical, mechanical chemical and thermal). Gaseous dielectrics, liquid insulating materials, solid insulating materials, films.

4. **Magnetic properties of materials:**

Magnetization, origin of permanent magnetic dipole moment, classification of Magnetic of materials, dia, para, ferro, antiferro & ferromagnetism, magnetic anisotropy, magnetostriction, soft & hard magnetic materials for electrical applications.

5. **Conductors:**

Electron gas model of a metal, Relaxation time, collision time, mean free path, electron scattering & resistivity, heating effect of current, thermal conductivity, superconductivity, electrical conducting materials (Cu, Al) & their application. Mechanical properties like corrosion, solid curability, contact resistance.

6. **Semiconductors and Devices:**

Density of carriers in intrinsic semiconductor & in n-type & p-type semiconductor, conductivity, Hall effect, drift & diffusion current, Einstein relation.

## **6. Semiconductor Device Fabrication:**

### **Books:**

1. Electrical Engineering Material---Dekker A.J. (PHI)
2. A course in Electrical Engineering Material—Seth & Gupta
3. Electrical Engineering Material---Rajput A.K.
4. Electrical Engineering Material---C.S. Indulkar & S. Thiruvengadam.

### **EE 341: Network Analysis**

L T P  
(3 – 1 – 0)  
Theory Marks  
= 100  
Sessional  
Marks = 50  
Time = 3  
hours

#### **1. Elements of electric circuits:**

The resistor: Practical engineering devices. Solid & wire frame of common resistive materials, carbon film and metal film resistors. Heat dissipating area (wattage), tolerance and temperature stability of resistors. Mathematical models, the capacitor: Comparison of properties of different traditional & modern dielectric materials (e.g. paper, ceramic, polystyrene polycarbonates etc.) Short description of electrolytic capacitor- wet & solid dielectrics, solid tantalum & aluminum capacitors, Mathematical models, the inductors: Mutual inductance, Properties of core materials. Brief studies of iron & ferrite cores, Mathematical models (only assignments).

#### **2. Transient phenomenon:**

Forcing functions-impulse, step and ramp functions Study and solution of simple circuits undergoing transient disturbances, A.C. transients, Time domain equations and solutions by Laplace transforms.

#### **3. Network topology:**

Elementary graph theory as applied to electrical networks. Matrices of graph: Incidence matrix, circuit matrix, cut set matrix. Advanced techniques of equation formulation for numerical solutions.

#### **4. Matrix methods for the solution of circuit equations:**

Solution of network equations by matrix methods. Methods suitable for simulating electric circuits on digital computers.

#### **5. Network theorems:**

Millman's theorem, Reciprocity theorem, Compensation & Tellegen's theorems...etc. Analysis of coupled circuits. The dot rule & equivalent conductivity coupled forms of magnetically coupled circuits.

#### **6. Two port Network:**

General principles, ABCD, Z, Y and hybrid parameters, Analysis of networks in tandem. Transmission lines. Lumped and distributed models. Characteristic impedance, Wave propagation constant, Reflection and terminations, attenuation and phase constants.

#### **7. Introduction to Network Synthesis:**

Foster and Cour forms of realization of network for given driving point impedance function

#### **BOOKS:**

1. A user's guide to selecting Electronic components---Gerald L. Sinsoutg (John Wiley)
2. Engineering Circuit analysis---- W. H. Hayt Jr. & J.E. Kemmerly (Mcgraw hill)
3. Electric Circuit----J.A. Edwinster. (Mcgraw hill)
4. Computer aided Network Design—Donald A. Calahan (Tata Mcgraw hill)
5. A course in Electric Circuit Analysis—Soni & Gupta

### **EE 345: ELECTRICAL ENGINEERING DRAWING, ESTIMATING AND COSTING (0-0-3)**

*(Note: There is no university examination for this course. Final assessment will be done through an internal examination at the end of the semester)*

**Max Mark: 50 (Sessional)**

**Pass Marks: 18**

**L – T – P  
0 – 0 – 2**

#### **Part I: Electrical Engineering Drawing**

1. Standard symbols used in Electrical and Electronics Engineering. (Sheet No.1)
2. Insulators used in power transmission and distribution systems. (Sheet No.2)
3. (i) Different types of underground cables and overhead conductors used in power transmission and distribution systems.(only X-sectional view).  
(ii) Various transmission and distribution towers. (Sheet No.3)
4. Different parts of Electrical Machines and Transformers. (Sheet No.4)

5. Single line diagram of generating stations, substations and interconnected power systems.  
(Sheet No.5)
6. Simple house wiring diagram. (Sheet No.6)
7. Different types of Electric Earthing (Sheet No.7)

### **Part II: Electrical Estimating and Costing**

8. Types of wiring systems, wiring materials and other accessories.
9. Estimating and costing of
  - a. electrical installations
  - b. lighting and power circuits of residential building and small industries
  - c. HT and LT overhead lines

#### **References:**

1. Electrical Design, Estimating and Costing – K. B. Raina and S. K. Bhattacharya
2. Electrical Wiring, Estimating and Costing – S. L. Uppal
3. Electrical Drawing and Estimation – C. R. Dargan
4. General Electrical Drawing – Surjit Singh
5. Electrical Engineering Drawing – K. L. Narang
6. Electrical Installation, Estimating and Costing – J. B. Gupta

## **IE 352: Instrumentation Engineering Drawing (0-0-3)**

Max Marks: 50 (Sessional)

Pass Marks: 18

- 1) Basic Components:-  
Power Sources, Resistors, Capacitors, Inductors, Switches, Connectors, Diode, Transistors, Thyristors, Integrated Circuits.
- 2) Measuring Instruments:-  
MI, PMMC, Hot-Wire, Induction Type & Electrostatic type Instruments, Analog Multimeter
- 3) System Components:-  
Resistive Potentiometers, strain gauge, LVDT, RVDT, Load-cell, Tachometers, Synchros, Stepper Motor, Seismic Sensors.
- 4) Basics of Control System:-  
Symbols, Open loop, Closed-loop systems block diagram.
- 5) Analytical & Industrial Instruments: -  
Humidity & Moisture sensors, Spectrometers, Pressure sensors, Flow Meters, Temperature Sensors.
- 5) Process Instruments & Biomedical Equipments: -

Hydraulic & Pneumatic valves-pitot, flapper, slide & two stage valves, ECG, EMG, EEG, Pacemaker, Sphygmomanometer.

Reference Books:

1) Industrial Instrumentation by D. Patranabis, TataMcgraw.