

**SYLLABUS**  
**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**  
**SEMESTER – II**

**APPLIED MATHEMATICS II**

**Sub. Code: DECE 201**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I**

**Unit 1: Co-ordinate Geometry -1**

Area of Triangle, Centroid and In centre of Triangle (given the Vertices of a Triangle), Simple Problems on Locus.

Equation of Straight Lines in Various Forms (without Proof) with their Transformation from one to another; Angle between Two Lines and Perpendicular Distance Formula (without Proof).

**Unit 2: Co-ordinate Geometry -2**

Circle: General Equation and its Characteristics given:

- The Centre and Radius;
- Three points on it;
- The Co-ordinates of the end's of the diameter.

Conics: Parabola, Ellipse and Hyperbola; Standard Equation of Conics (without Proof); Given the Equation of Conics to Calculate Foci, Directrix, Eccentricity, Lotus Rectum, Vertices and Axis Related to Different Conics.

**Unit 3: Differential Calculus -1**

Concept of Function: Four Standard Limits:

$\text{Lt } (x^n - a^n) / (x - a);$

$x \rightarrow a$

$\text{Lt } \sin x/x;$

$x \rightarrow 0$

$\text{Lt } (a^x - 1)/ x;$

$x \rightarrow 0$

$\text{Lt } (1 + x)^{1/x}.$

$x \rightarrow 0$

Concepts of Differentiation and its Physical Interpretation.

Differential by First Principle of  $x^n$ ,  $(ax + b)^n$ ,  $\sin x$ ,  $\cos x$ ,  $\tan x$ ,  $\text{cosec } x$  and  $\cot x$ ,  $e^x$ ,  $a^x$ ,  $\log x$

Differentiation of Sum, Product and Quotient of Different Functions.

Logarithmic Differentiation, Successive Differentiation excluding  $n^{\text{th}}$  order

## **Unit 4: Differential Calculus - 2**

Application of Derivatives for (a) Rate Measure, (b) Errors, (c) Real Root by Newton's Method, (d) Equation of Tangent and Normal (e) Finding the Maxima and Minima of a Function (Simple Engineering Problems).

## **BLOCK II**

## **Unit 5: Integral Calculus - 1**

Integration as Inverse Operation of Differentiation.

Simple Integration by Substitution by Parts and by Partial Fractions

Evaluation of Definite Integrals (Simple Problems) by Expanding; the General Properties of Definite Integrals.

## **Unit 6: Integral Calculus - 2**

Application of Integration for Simple Problem on Evaluation of Area under a Curve where Limits are prescribed for Circle, Ellipse, Parabola and Straight Line.

Calculation of Volume of a Solid formed by Revolution of an Area about Axis (Simple Problems) where Limits are prescribed for Sphere and Cylinder.

To calculate Average and Root Mean Square of a Function.

Area by Trapezoidal Rule and Simpson's Rule.

## **Unit 7: Differential Equations**

Solution of First Order and First Degree Differential Equation by Variable Separation and their Simple Numerical Problem.

## **Suggested Readings:**

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers.
2. Engineering Mathematics, C Dass, Chawla, Asian Publishers.
3. Engineering Mathematics, S. Dasgupta, McGraw-Hill.
4. Advanced Engineering Mathematics by A.B. Mathur and V.P Jaggi, Khanna Publishers.
5. Applied Mathematics Vol. II, RD Sharma, Khanna Publishers.
6. A text Book of Matrices, Shanti Narayan, S. Chand & Co.
7. Calculus and Analytical Geometry, Thomas/Finney, Narosa Publishing House.
8. Mathematics for Engineers, C.Prasad, Prasad Mudranalaya.
9. Differential & Integral Calculus, N Piskunov, Moscow Peace Publisher.
10. Higher Engineering Mathematics, Bird, J O, Butter worth-Heinemann.
11. Introduction to Engineering Mathematics, Croft, Davis & Hargreaves, Addison-Wesley.

## **Note:**

1. Eight questions are to be set. Students will have to attempt five questions in all.
2. Use of non-programmable scientific calculator is allowed in Examination Hall.

**SYLLABUS**  
**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**  
**SEMESTER – II**

**BASIC MECHANICAL ENGINEERING**

**Sub. Code: DECE 202**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I**

**Unit 1: Mechanical Properties of Metals**

Definitions; Elasticity; Plasticity; Ductility; Brittleness; Toughness; Hardness; Malleability; Fatigue; Examples of Applications of above Terms Related to Engineering.

**Unit 2: Basic Concept of Thermal Engineering**

Energy: Internal Energy, Potential Energy, Kinetic Energy; Heat: Work and Enthalpy, Specific Heat, Specific Heat Ratio; Characteristics Gas Equation; Universal Gas Constant; First Law of Thermodynamics; Second Law of Thermodynamics.

**Unit 3: Hydraulics**

Physical Properties of a Fluid: Density, Specific Volume, Specific Weight, Specific Gravity Viscosity; Pascal's Law; Pressure Measuring Devices: Manometers, Simple Manometers, Differential Manometers, Inverted 'U' Tube, Pressure Gauges; Continuity Equation; Bernoulli's Theorem: Energy of a Fluid, Pressure Energy, Velocity Energy, Datum Energy; Venturimeter & its Uses.

**Unit 4: Pumps and Turbine**

Pumps: Types of Lumps, Centrifugal Pump, Reciprocation Pump, their Relative Advantages and Performance.

Turbine: Working Principles and Types of Water Turbines, Selection of Turbines, Brief Idea of Turbine, Pelton Wheel Turbine, Francis Turbine.

**BLOCK II**

**Unit 5: Properties of Steam**

Generation of Steam at Constant Pressure, Enthalpy of Water Wet Steam, Enthalpy of Dry Saturated Stem, Dryness Fraction, Superheated Steam, Latent Enthalpy, Enthalpy of Steam, Specific Volume, External Work During Evaporation, Internal Content Enthalpy, Internal Energy of Steam, Use of Steam Table

### **Unit 6: Boilers and Steam Turbines**

Boilers: Classification of Boilers, Working of Common Boilers, Babcox and Wilcox, Chichram Boiler, Boiler Mounting and their Accessories, Introduction to Modern High Pressure Boiler for Thermal Power Station: Lamont Boiler, Weffler Boiler, Benson Boiler and Velox Boiler.

Steam Turbines: Introduction, Types of Steam Turbine, Working Principle of Steam Turbine Uses and Advantages of Steam Turbine.

### **Unit 7: I.C. Engines**

I.C. Engine Cycle: Otto, Diesel; Working Principle: Two Stroke Petrol and Diesel, Four Stroke Petrol and Diesel.

### **Unit 8: Transmission and Lubrication**

Transmission: Belt Drive, Rope Drive, Velocity Ratio, Tension Ratio, Effect of Centrifugal Tension; Application of these Drives.

Lubrication: Object of Lubrication, Different Methods of Lubrication, Properties of Lubricants.

### **Suggested Readings:**

1. Thermodynamics & Heat Power Engineering, Mathur & Mehta, Jain Brothers.
2. Thermal Engineering, P.L. Ballaney, Khanna Publishers.
3. A Text Book of Hydraulics, Khurmi, S. Chand.
4. A Text Book of Hydraulic Machines, Khurmi, S. Chand.
5. Strength of Materials, G.H.Ryder, Macmillan, India.
6. Strength of Materials: A Rudimentary Approach, M.A. Jayaram, Sapna Book House.
7. Elements of Heat Engines: Pande & Shah, Charotar Publishing House.

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**SYLLABUS**  
**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**  
**SEMESTER – II**

**BASIC ELECTRICAL ENGINEERING**

**Sub. Code: DECE 203**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I**

**Unit 1: DC Circuits**

Concept of Electricity; Various Applications of Electricity; Advantages of Electricity over other Types of Energy; Basic Terms: Voltage, Current, Potential Difference, Power; Energy and their Units.

Ohm's Law and its Practical Applications; Concepts of Resistance, Conductance, Resistivity and their Units.

Effect of Temperature on Resistance; Temperature Coefficient of Resistance.

Series and Parallel Combination of Resistors; Wattage Consideration; Simple Problems.

Kirchhoff's Current Law and Kirchhoff's Voltage Law and their Applications to Simple Circuits.

Conversion of Circuits from Star to Delta and Delta to Star.

**Unit 2: DC Circuits Theorems**

Thevenin's Theorem; Norton's Theorem; Super Position Theorem; Maximum Power Transfer Theorem, Application of Network Theorem in solving D.C Circuit Problems.

Constant Voltage and Constant Current Sources: A) Concept of Constant Voltage Source, Symbol and Graphical Representation, Characteristics of Ideal and Practical Sources, B) Concept of Constant Current Sources, Symbol, Characteristics and Graphical Representation of Ideal and Practical Current Sources.

**Unit 3: Electro Magnetic Induction**

A) Concepts of Magnetic Field Produced by Flow of Current; Magnetic Circuit; Concept of Magneto-Motive Force (MMF); Flux; Reluctance; Permeability; Analogy between Electric and Magnetic Circuit.

B) Faraday's Law and Rules of Electro-Magnetic Induction; Principles of Self and Mutual Induction; Self and Mutually Induced E.M.F; Simple Numerical Problems.

C) Concept of Current Growth; Decay and Time Constant in RL and RC Circuit.

D) Energy Stored in an Inductor; Series and Parallel Combination of Inductors.

#### **Unit 4: Batteries**

Basic Idea about Primary and Secondary Cells; Construction; Working and Applications of Lead-Acid Battery and Nickel-Cadmium Cells; Silver-Oxide Cells; Charging Methods used for Lead-Acid Battery (Accumulator); Care and Maintenance of Lead-Acid Battery; Series and Parallel Connections of Batteries; General Idea of Solar Cells; Solar Panels and their Applications

### **BLOCK II**

#### **Unit 5: AC Fundamentals**

Concept of Alternating Voltage and Current; Difference between A.C and D.C; Concept of Cycle, Frequency, Time Period, Amplitude, Instantaneous Value, Average Value, R.M.S. Value, Maximum Value, Form Factor and Peak Factor; Representation of Sinusoidal Quantities by Phasor Diagrams; Equation of Sinusoidal Wave Form (with Derivation); Effect of Alternating Voltage Applied to a Pure Resistance, Pure Inductance and Pure Capacitance.

#### **Unit 6: AC Circuits**

Inductive Reactance and Capacitive Reactance; Alternating Voltage Applied to Resistance and Inductance in Series; Alternating Voltage Applied to Resistance and Capacitance in Series; Impedance Triangle and Phase Angle; Solutions and Phasor Diagrams for Simple RLC Circuits (Series and Parallel); Introduction to Series and Parallel Resonance and its Conditions; Power in Pure Resistance, Inductance and Capacitance, Power in Combined RLC Circuits; Power Factor; Active and Reactive Power and their Significance; Importance of Power Factor; J-Notation and its Application in Solving a Series and Parallel AC Circuits; Definition of Conductance, Susceptance and Admittance

#### **Unit 7: Various Types of Power Plants**

Brief Explanation of Principle of Power Generation in Thermal, Hydro and Nuclear Power Stations and their Comparative Study; Elementary Block Diagram of above Mentioned Power Stations.

#### **Suggested Readings:**

1. Electrical Technology, Vol. I, B.L. Theraja, S. Chand & Company Ltd.
2. Electrical Engineering, V.K. Mehta, S. Chand & Company Ltd.
3. Electrical Engineering,, Nitin Saxena, Laxmi Publisher.

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**SYLLABUS**  
**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**  
**SEMESTER – II**

**BASIC ELECTRONICS**

**Sub. Code: DECE 204**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I**

**Unit 1: Semiconductor Physics**

Review of Basic Atomic Structure and Energy Levels; Concept of Insulators; Conductors and Semi Conductors; Atomic Structure of Ge and Si; Covalent Bonds.

Concept of Intrinsic and Extrinsic Semi Conductor; P and N Impurities; Doping of Impurity.

P and N Type Semiconductors and their Conductivity; Effect of Temperature on Conductivity of Intrinsic Semi Conductor.

Energy Level Diagram of Conductors; Insulators and Semi Conductors; Minority and Majority Carriers.

**Unit 2: Semi Conductor Diode**

PN Junction Diode; Mechanism of Current Flow in PN Junction; Drift and Diffusion Current; Depletion Layer; Forward and Reverse Biased PN Junction; Potential Barrier; Concept of Junction Capacitance in Forward and Reverse Bias Condition.

V-I Characteristics; Static and Dynamic Resistance and their Calculation from Diode Characteristics.

Diode as Half Wave, Full Wave and Bridge Rectifier; PIV, Rectification Efficiencies and Ripple Factor Calculations; Shunt Capacitor Filter, Series Inductor Filter, LC Filter and  $\pi$  Filter.

Types of Diodes; Characteristics and Applications of Zener Diodes; Zener and Avalanche Breakdown.

**Unit 3: Introduction to Bipolar Transistor**

Concept of Bipolar Transistor, Structure, PNP and NPN Transistor, their Symbols and Mechanism of Current Flow; Current Relations in Transistor; Concept of Leakage Current; CB, CE, CC Configuration of the Transistor; Input and Output Characteristics in CB and CE Configurations; Input and Output Dynamic Resistance in CB and CE Configurations; Current Amplification Factors. Comparison of CB CE and CC Configurations; Transistors as an Amplifier in CE Configurations; D.C Load Line and Calculation of Current Gain, Voltage Gain using D.C Load Line.

## **BLOCK II**

### **Unit 4: Transistor Biasing Circuits**

Concept of Transistor Biasing and Selection of Operating Point; Need for Stabilization of Operating Point; Different Types of Biasing Circuits.

### **Unit 5: Single Stage Transistor Amplifier**

Single Stage Transistor Amplifier Circuit; A.C Load Line and its use in Calculation of Currents and Voltage Gain of a Single Stage Amplifier Circuit; Explanation of Phase Reversal of Output Voltage with respect to Input Voltage; H- Parameters and their Significance; Calculation of Current Gain; Voltage Gain; Input Impedance and Output Impedance using h-Parameter.

### **Unit 6: Field effect Transistors**

Construction, Operation and Characteristics of FET and Its Application; Construction, Operation and Characteristics of MOSFET in Depletion and Enhancement Modes and its Applications; C MOS: Advantages and Applications; Comparison of JFET, MOSFET and BJT; FET Amplifier Circuit and its Working Principle. (No Analysis).

### **Suggested Readings:**

1. Basic Electronics and Linear Circuit, NN Bhargava and Kulshreshta, Tata McGraw Hill.
2. Principles of Electrical and Electronics Engineering, VK Mehta; S Chand and Co.
3. Electronic Components and Materials, SM Dhir, Tata McGraw Hill.
4. Electronics Devices and Circuits, Millman and Halkias; McGraw Hill.
5. Principles of Electronics, Albert Paul Malvino; Tata McGraw Hill.
6. Electronics Devices and Circuits-I, Naresh Gupta, Jyotesh Malhotra and Harish C Saini, Eagle Prakashan.
7. Electronics Devices and Circuits by Rama Reddy, Narosa Publishing House Pvt. Ltd.

### **Note:**

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**SYLLABUS**  
**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**  
**SEMESTER – II**

**ENGINEERING DRAWING**

**Sub. Code: DECE 205**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I**

**Unit 1: Introduction**

Application of Engineering Drawing in Engineering; Lettering and Dimensioning; Construction of Geometrical Figures like Pentagon; Hexagon etc.

**Unit 2: Scales**

Plain Scale; Diagonal Scale; Venier Scale.

**Unit 3: Projections**

First Angle and Third Angle Projections; Simple Projection of Points; Lines and Planes; Orthographic Projection of Simple Solids in Simple Positions.

**Unit 4: Sections**

Importance and Salient Features; Drawing of Full Section; Half Section; Partial or Broken Out Sections; Offset Sections; Revolved Sections and Removed Sections; Drawing of Different Conventions for Materials Intersection.

**Unit 5: Isometric Projections**

Principle of Isometric Projection; Isometric Projection using Box and Offset Method

**Unit 6: Development of Surfaces**

Development of Surfaces of Regular Solids like Pyramids and Prisms.

**Suggested Readings:**

1. Elementary Engineering Drawing, Bhatt N.D, Charoathar Publisher
2. A Text Book of Practical Geometry on Geometrical Drawing, Laxmi Narayan V & Vaish W, Pearson Education.
3. Design for manufacture, Cordett J, Dooner M, Meleka J and Pyn C, Addison Wesley.
4. The Engineering Design Process, Hawkes B and Abinett R, Longman.

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