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

**APPLIED MATHEMATICS I**

**Sub. Code: DECE 101**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I**

**Unit 1: Algebra - 1**

Application of Quadratic Equations; Simultaneous Equations (One Linear and Other Quadratic Equation) in Two Variables to Engineering Problems.

Arithmetic Progression, its  $n$ th Term and Sum of  $n$  Terms with their Applications to Engineering Problems.

Geometrical Progression, its  $n$ th Term and Sum of  $n$  Terms and to Infinity with Application to Engineering Problems.

**Unit 2: Algebra – 2**

Partial Fractions (Excluding Repeated Quadratic Factors)

Introduction to Permutations & Combinations; Applications of Formulae.

Binomial Theorem (Expansion without Proof) for Positive Integral Index (Expansion and General Term); Binomial Theorem for any Index (Expansion without Proof only); First and Second Binomial Approximation with Application to Engineering Problems.

Logarithm General Properties of Logarithms, Calculations of Engineering Problems using Log Tables

**Unit 3: Determinants and Matrices**

Determinants and Matrices-Expansion of Determinants (up to Third Order) using Sarrus Rule, Expansion Method and Pivotal's Condensation Method; .Properties of Determinants; Solutions of Equations (up to 3 unknowns) by Cramer's Rule; Definition of Matrix; Addition, Subtraction and Multiplication of Matrices (up to Third Order); .Inverse of a Matrix by Ad-joint Method and Elementary Row Transformations. Solution of Equations (up to 3 unknowns) by Matrix Method

## **BLOCK II**

### **Unit 4: Trigonometry**

Addition and Subtraction Formulae; Product Formulae and their Application in Engineering Problems; Transformation from Product to Sum or Difference of Two Angles and vice versa; Multiple and Sub-multiple Angles.

Conditional Identities; Solution of Triangles (excluding Ambiguous Cases).

Graphs of  $\sin x$ ,  $\cos x$ ,  $\tan x$  and  $e^x$

### **Unit 5: Vectors**

Definition of Vector and Scalar Quantities; Addition and Subtraction of Vectors; Dot Product and Cross Product of Two Vectors; .Thumb Rule; Angle between Two Vectors; Application of Dot and Cross Product in Engineering Problems

### **Unit 6: Complex Numbers**

Definition; Real and Imaginary Parts of a Complex Number; Polar and Cartesian Representation of a Complex Number and Conversion from One to the Other; Conjugate of a Complex Number; Modules and Argument of a Complex Number.

### **Suggested Readings:**

1. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers.
2. Mathematics Vol. I, SS Sabharwal et. al., Eagle Prakashan.
3. Mathematics Vol. II, SS Sabharwal et. al., Eagle Prakashan
4. Advanced Engineering Mathematics, A B Mathur and V.P. Jagi; Khanna Publishers.
5. Engineering Mathematics, C Dass Chawla, Asian Publisher.
6. Engineering Mathematics, S Kohli and others, IPH.

### **Note:**

1. Eight questions are to be set, at least one question from each unit. 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 – I**

**PHYSICS**

**Sub. Code: DECE 102**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I:**

**Unit 1: Units & Dimensions**

Fundamental and Derived Units in SI System; Dimensions of Physical Quantities; Principle of Homogeneity; Dimensional Equation; Applications of Dimensional Analysis; Checking the Correctness of Physical Equations; Derivation of Simple Physical Relations; Limitation of Dimensional Analysis.

**Unit 2: Force & Motion**

Scalars and Vectors; Velocity & Acceleration; Equations of Motion; Newton's Laws of Motion; Composition and Resolution of Forces; Motion of Projectiles: Parabolic Motion, Trajectory, Time of Flight, Horizontal Range and Maximum Horizontal Range, Centripetal Acceleration; Centripetal and Centrifugal Forces; Concept of Friction..

**Unit 3: Work, Power and Energy**

Work and its Units; Work Done on Bodies Moving on Horizontal and Inclined Planes; Concept of Power and its Units; Calculations of Power (Simple Cases); Concept of Kinetic Energy and Potential Energy; Law of Conservation of Energy; Conservation of Energy in Case of Freely Falling Bodies.

**Unit 4: Waves and Vibrations**

Simple Harmonic Motion (SHM): Definition, Dynamics of Simple Harmonic Motion; Energy of Simple Harmonic Motion; Vibration: Types of Vibration; Vibration Analysis: Free Vibration without Damping, Free Vibration with Damping, Forced Vibration, Resonant Vibration; Wave Motion: Types of Wave, Transverse and Longitudinal and Surface Wave, Relation between Velocity of Wave, Frequency and Wave Length of a Wave; Sound and Light Waves; Applications of Sound Waves in Engineering.

## **BLOCK II**

### **Unit 5: Heat**

Concept of Heat and Temperature; Unit of Temperature; Basic Principles and Methods of Measurement of Temperature: Thermocouple, Resistance and Bimetallic Thermometer, Pyrometers, Clinical and other Thermometers; Three Modes of Transfer of Heat: Conduction, Convection, Radiation, Coefficient of Thermal Conductivity, Thermal Resistance; Expansion of Solids: Linear thermal expansion coefficient, Surface thermal expansion coefficient, Volume thermal expansion coefficient, Relation amongst Three thermal expansion coefficients; Heat Radiation: Characteristics of Heat Radiation; Prevost's Theory; Black Body Radiations: Emissivity and Absorbivity, Kirchoff's Law, Stefan's Law.

### **Unit 6: Principle of Optics**

Reflection of Light: Laws of Reflection; Refraction of Light: Refractive Index; Concept of Mirror: Convex Mirror, Concave Mirror, Mirror Equation and Magnification; Concept of Lens: Lens Formulae, Real and Virtual Image, Magnification Power of Lens; Simple and Compound Microscope; Optical Telescope; Total Internal Reflection: Critical Angle, Conditions for Internal Reflection

### **Unit 7: Electrostatics**

Coulombs Law: Electric and Magnetic Constants, Unit Charge, Electric Field, Electric Field of Point Charge, Electric Flux; Gauss's Law: Electric Field of Point Charge, Electric Field of Conducting Sphere, Electric Field: Outside a Sphere of Uniform Charge, Electric Field: Inside a Sphere of Charge, Electric Field of Line Charge, Electric Field: Conducting Cylinder, Electric Field: Sheet of Charge, Electric Field: Parallel Plates.

### **Unit 8: Electricity and Magnetism**

Ohm's Law: Specific Resistance; Kirchoff's Laws; Wheatstone Bridge: Operation and Significance; Joule Effect - Heating Effect of Current: Concept of Electric Power; Magnetic Fields and Forces; Magnetic Fields due to Current; Ampere's Law; Faraday's Law of Induction: Lenz's Law, Self Induction, Mutual Induction

### **Suggested Readings:**

1. Applied Physics Vol. I & II, TTTI Publication Tata McGraw Hill.
2. Basic Applied Physics, RK Gaur; Dhanpat Rai and Co.
3. Numerical Problems in Physics: Volume I and II by RS Bharaj; Tata McGraw Hill
4. Text book of Physics, Vol. I & II, Resnik and Halliday, Wiley India.
5. Engineering Physics, R. Gaur & S. L. Gupta, Dhanpat Rai and Co.

### **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 – I**

**CHEMISTRY**

**Sub. Code: DECE 103**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I**

**Unit 1: Structure of Atom**

Introduction; Fundamental Particles of Atom; Electron, Proton and Neutron.; Bohr's Model of Hydrogen Atom; Line Spectrum of Hydrogen Atom; Limitation of Bohr's Model; Modern Concept of Atom; Four Quantum Numbers; Pauli's Exclusion Principle; Types of Bonds; Modern Periodic Table of Elements.

**Unit 2: Chemical Equation, Oxidation & Reduction**

Basic Concept of Elements; Mixture and Compound; Chemical Equation, its Balancing; Implications and Limitations.

Concept of Oxidation & Reduction: Electronic Concept of Oxidation and Reduction, Redox Reactions (Direct and Indirect), Oxidation No, Balancing of Simple Redox Reactions by Oxidation No.

**Unit 3: Ionic Equilibrium**

Ionization; Degree of Ionization; Focus Effecting Ionization; Ionization of Water; Ionization Equilibrium in Aqueous Solutions; Common Ion Effect.

**BLOCK II**

**Unit 4: Acids & Bases**

Concept of Acids and Bases & their Strength in Ionization Constant; PH Value; Acid Base Titration; Choice of Indicators; Hydrolysis; Buffer Solution.

**Unit 5: Electrolysis:**

Introduction; Concept of Electrolysis; Faraday's Law of Electrolysis; Engineering Applications; (Electro-Metallurgy; Electroplating & Electro-Refining).

**Unit 6: Water**

Hard and Soft Water; Removal of Hardness by A) Soda Lime Process), Permutit's Process, C). Ion Exchange Method.

Disadvantages of Hard Water in Industrial Use; Boiler Scales; Priming; Foaming Corrosion and Caustic Embitterment; Expressing the Degree of Hardness of Water in (with Simple Problems): A) Clark's Degree, B) O'Hener's Method; Determination of Degree of Hardness by (with Simple Problems): A) Soap Titration Method, B) O'Hener's Method; Water for Drinking Purposes.

### **Unit 7: Solutions & Colloids:**

Solute; Solvent; Solution & Colloids; Particle Size and Colloidal State; Tyndell Effect; Brownian Movement; Coagulation.

### **Suggested Readings:**

1. Chemistry in Engineering, J.C. Kuriacose and J. Rajaram, Tata McGraw-Hill.
2. Chemistry in Engineering, Dr. S. Rabindra and Prof. B.K. Mishra, Kumar and Kumar Publishers.
3. A Text Book of Applied Chemistry-I, SS Kumar, Tata McGraw Hill.
4. A Text Book of Applied Chemistry-I, Sharma and Others, Technical Bureau of India.

### **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 – I**

**FUNDAMENTALS OF COMPUTERS**

**Sub. Code: DECE 104**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I**

**Unit 1: Introduction to Computer System**

An Overview of the Computer System; the Processor (CU; ALU); Factors Affecting Processor Speed; the Bus: Data Bus and Address Bus; Memory (RAM; ROM; Registers; Cache).

**Unit 2: I/O Devices**

Introduction; I/O Devices: Mouse, Keyboard, Monitors, Printers, Pens, Touch, Screens, Microphones, and Voice Recognition; Storage Devices: Diskettes, Hard Disc, CD-ROM; Computer Categorization.

**Unit 3: Introduction to Networks**

Networks-Uses; Categories & Topologies; System Software and Application Software; Operating System; User Interface; Resource Management; Utility Software.

**BLOCK II**

**Unit 4: Introduction to Database Management**

Word Processing and Desktop Publishing; Spreadsheets; Basics of Database Management.

**Unit 5: Programming Languages**

Programming Language: High-level language, Low Level Language & Assembly language; Major Features of the Internet; Working with Graphics.

**Unit 6: Information Systems**

Types of Information Systems; System Development Life Cycle.

## **Suggested Readings:**

1. Computer Fundamentals, P.K Sinha, BPB Publications.
2. Computers Today, Suresh .K Basandra, Galgotia Publications Private Ltd.
3. Computer Installation Troubleshooting, M. Radha Krishnan & D. Balasubramanian, ISTE Learning Material.
4. Computer Organization & Design, P. Pal Chaudhuri, Prentice Hall of India.

## **Note:**

1. Eight questions are to be set; at least one question from each unit. 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 – I**

**COMMUNICATION TECHNIQUES**

**Sub. Code: DECE 105**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**BLOCK I**

**Unit 1: Correspondence (Official, Business and Personal)**

One Letter from each Category - Official, Business and Personal may be set in the examination paper and the students be asked to write one of them.

**Unit 2: Grammar**

A Brief Review of Easy Form of Tenses; Conversion of Direct Narration into Indirect Form of Narration and Vice Versa (only Simple Sentences); Punctuation.

**Unit 3: Essay**

Preferably on Scientific Topic from the given outlines - the Paper Setter may be instructed to give a choice of attempting one out of three topics. The question paper may provide the outlines. The essay will be of 250 to 300 words. The examiner may select three topics one from each of the following.

- A) Science;
- B) Technology;
- C) General.

**Suggested Readings:**

1. Text Book on English and Communication Skills, Book-I, Kuldeep Jaidka et.al. Developed by NITTR, Chandigarh.
2. New Design English Grammar: Reading and Writing Skills, (Course A and course B), A. L. Kohli; Kohli Publishers.
3. New Design English Reading and Advanced Writing Skills for Class XI and XII, M. K Kohli and A. L Kohli, Kohli Publishers.

**Note:**

1. Six questions are to be set; at least one question from each unit. Students will have to attempt four questions in all.
2. Use of non-programmable scientific calculator is allowed in Examination Hall.