EIILM University

DIRECTORATE OF DISTANCE LEARNING

SYLLABUS BOOKLET
Semester – I TO VI

DIPLOMA IN CIVIL ENGINEERIN (DCE)

JAN 2010 ONWARDS

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
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 nth Term and Sum of n Terms with their Applications to Engineering Problems. Geometrical Progression, its nth 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 Adjoint 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 CIVIL ENGINEERIN
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 Absorbtivity, 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; Kirchhoff'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.

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

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

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.

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, 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^{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 Exploding; 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.

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.

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.

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.

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.

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 π Filter. Types of Diodes; Characteristics and Applications of Zenor Diodes; Zenor 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:
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.

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, Charothar 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.

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.

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SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – III

COMPUTER APPLICATIONS I

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Sub. Code: DCE 310   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

1. Familiarization With Operating System
Introduction to computer Operating System (Dos, Windows'95).
Introduction to Dos structure, system files, batch files & configuration files.
Booting the system from floppy & hard disk.
Brief Introduction to Dos internal & external commands.
Familiarisation with windows structures, its use and application.

SECTION B

2. Preparation of Documents Through Word Processing .
Idea of text editors like Microsoft word, write etc.
Opening a document.
Preparing documents, inserting diagrams & tables.
Editing document.
(a) Character, word and Line Editing.
(b) Margin Setting, Paragraph alignment.
(c) Block Operations.
(d) Spell Checker
(e) Saving a document.

SECTION C

3. Information Presentation For Decision Making Using Spread Sheet:
(Excel/Lotus 1 23)
Applications of spread sheet.
Structure of spread sheet.
Preparing spread sheet for simple data and numeric operations.
Using formulae in spread sheet operations.
Making Tables, sorting and querying.
Creation of graphs, Pie charts, bar charts.
Printing reports.

SECTION D

4. Computer aided Drafting (CAD)
Making simple drawings using features of CAD and confirming the drafting spacifications.
Saving and retrieving drawings.
Dimensioning.
Lettering.
Plotted drawing

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – III

COMPUTER APPLICATIONS I

Sub. Code: DCE 310P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

Simple exercises based upon theory syllabus.

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – III

APPLIED MECHANICS

Sub. Code: DCE 320   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

1. Introduction
Concept of mechanics and applied mechanics Explanation of Mechanics and applied Mechanics, its importance and necessity, giving suitable examples on bodies at rest and in motion, explanation of branches of this subject. Concept of rigid bodies.

SECTION B

2. Laws of Forces
Force and its effects, units and measurement of force, characteristics of force vector representation, Bow's notation, Types of forces, action and reaction, tension, thrust and shear force. Force systems Coplaner and space force systems. Coplaner concurrent and nonconcurrent forces. Free body diagrams, Resultant and components concept of equlibirium ;Parallelogram law of forces. Equilibirium of two forces, superposition and transmissibility of forces, Newton's third law, triangle of forces, different cases of concurrent coplanar, two force systems, extension of parallelogram law and triangle law to many forces acting at one pointpolygon law of forces, method of resolution into orthogonal components for finding the resultant, graphical methods, special case of three concurrent, coplanar forces, Lami's theorem.

3. Moments
Concept of moment, Varignon's theorem – statement only. Principle of moments – application of moments to simple mechanism, parallel forces, calculation of their resultant, concept of couple properties and effect, moving a force parallel to its line of action, general cases of coplanar force system, general conditions of equilibirium of bodies under coplanar forces.

4. Friction
Concept of friction, laws of friction, limiting friction and coefficient of friction, sliding friction.

SECTION C

5. Centre of Gravity
Concept of gravity, gravitational force, centroid and center of gravity, centroid for regular lamina and center of gravity for regular solids. Position of center of gravity of compound bodies and centroid of composition area. CG of bodies with portions removed.

SECTION D

6. Laws of Motion
Concept of momentum, Newton's laws of motion, their application, derivation of force equation from second law of motion, numerical problems on second law of motion, piles, lifts, bodies tied with string. Newton's third law of motion and numerical problems based on it, conservation of momentum, impulsive force (definition only).

7. Simple Machines.
Concept of machine, mechanical advantage, velocity ratio and efficiency of a machine their relationship, law of machine, simple machines (lever, wheel and axle, pulleys, jacks winch crabs only).

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – III

APPLIED MECHANICS

Sub. Code: DCE 320P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1.   Verification of the laws of polygon of forces.

2.   To verify the forces in the different members of a jib crane.

3.   To verify the reaction in the supports of a simple supported beam.

4.   To find the mechanical advantage, velocity ratio and efficiency in the case of inclined Planes.

5.   To find the mechanical advantage, velocity ratio and efficiency in the case of Screw Jack.

6.   To find the mechanical advantage, velocity ratio and efficiency in the case of Worm and Worm Wheel.

7.   To find the mechanical advantage, velocity ratio and efficiency in the case of Winch Crab Single Graphical Representation.

8.   To find out center of gravity of regular laminas.

9.   To find out center of gravity of irregular laminas.

10. To determine coefficient of friction between 3 pairs of given surfaces.

11. To determine personal horse power of the experimenter

CONSTRUCTION MATERIALS

Sub. Code: DCE 330   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

1. Building Stones
Classification of Rocks: (Brief review only) Geological classification: Igneous, sedimentary and metamorphic rocks. Chemical classification: Calcareous, argillaceous and siliceous rocks. Physical classification: Unstratified, stratified and foliated rocks. General characteristics of stones. Requirments of good building stones and their testing. Identifications of common building stones. Various uses of stones in construction.

2. Bricks and Tiles
Introduction to bricks. Raw materials for manufacturing and properties of good brick making earth. Manufacturing of bricks

1. Preparation of clay (manual/mechanically).
2. Moulding: hand moulding and machine moulding, drying of bricks, burning of bricks, types of Kilns (Bull's Trench Kiln; traditional brick, refractory brick, clay flyash bricks, sundried bricks.

Classification of bricks as per BIS:1077, Size of brickIS specifications, commercial sizes. Testing of common building bricks as per BIS: 3495 Compressive strength, water absorption, efflorescence, dimensional tolerance test. Special bricks.

1. Building tiles: Types of tileswall, ceiling, roofing and flooring tiles
2. Ceramic tiles, their properties and uses.

Stacking of bricks and tiles at site.

3. Cement
Introduction, raw materials, manufacture of ordinary Portland cement, flow diagram for wet and dry process. Properties and uses of ordinary portland cement. Testing of cement as per BIS: Strength of cement, fineness by sieving, consistenecy, soundness, setting times. Special Cements and their uses. Storage of Cement.

SECTION B
4. Lime
Introduction: Lime as one of the following materials. Natural sources for the manufacture of lime. Definition of terms: quick lime, fat lime, hydraulic lime, hydrated lime, lump line. Calcination and slaking of lime. IS classification of lime. Testing of lime.

5. Timber and Wood Based Products
Classification of trees: Exogeneous and Endogeneous trees, crosssection of an exogenous tree and explanation of various terms. Identification of various types of timber: Teak, Deodar, Shisham, Sal, Mango, Kail and Chir. Market forms of converted timber as per BIS. Seasoning of timber: Purpose, methods of seasoning, Kiln seasoning as per BIS. Defects in timber, decay in timber. Preservation of timber and methods of treatment as per BIS. Properties of timber and specifications of stuctural timber. Common structural timbers in India, their availability and usesTeak, Deodar, Shisham, Sal, Mango, Kail and Chir. Plywood; Veneers and veneering, manufacturing plywood (brief description only), uses of plywood. Other wood based products, their brief description of manufacture and uses; laminated board, block board, fibre board, hard board and gypsum board, applications of boards in false ceiling and wall paneling.

SECTION C
6. Paints and Varnishes
Purpose and uses of paints. Different types of paints: oil paints, water paints, cement paints and plastic paints.
  (i)   Oil paints: Constituents of an oil paint, raw materials used for different constituents of oil paints and their properties, preparation of an oil paint, characteristics of a good oil paint. Application on wood and metal surfaces.
  (ii)   Cement paints commonly available cement paints, their properties and uses. Application of cement paints
  (iii) Water paint, Plastic paints and their uses.
  (iv)   Varnishes and polishtypes, properties and their uses.
  (v)   Lacquers and enamels their properties and their uses.

SECTION D
7. Metals
Ferrous Metals: Composition, properties and uses of cast iron, steel (mild and high tension steel), requirements of mild steel as per BIS. Non Ferrous Metals: properties and uses of the following non ferrous metals in Civil Engineering works copper, lead, zinc, tin and aluminium. Commercial forms of ferrous and non ferrous metals.

8. Miscellaneous Materials
Plastics: Important commercial products of plastics used in Civil Engineering Construction. Asbestos based products: Commercial forms and their uses. Insulating materials for Sound and Thermal Ins ulation Geotextiles. Construction chemicals like: water proofing compounds epoxies, sulphides, polymers. Glass: Types of glasses, their properties. Commercial forms and uses: plate glass, wired glass, bullet resisting glass, coloured glass, fibre glass, foamed glass wool, float glass, glass reinforced plastic. Water proffing materials; Bitumen sheets and felts, chemical admixtures Composite materials.

Note: A field visit may be planned to explain and show the relevant things

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – III

CONSTRUCTION MATERIALS

Sub. Code: DCE 330P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1. To physically identify different types of stones.

2. To determine the crushing strength of stones.

3. To determine the water absorption of bricks.

4. To conduct dimensional tolerance test on bricks.

5. To conduct field tests on cement.

6. To determine fineness (by sieve method) of cement.

7. To determine normal consistency of cement.

8. To determine initial and final setting times of cement.

9. To determine soundness of cement.

10. To determine compressive strength of cement.

11. To identify various types of timbers such as: Teak, Sal, Chir, Sisso, Deodar, Kail, Mango etc.

BUILDING CONSTRUCTION

Sub. Code: DCE 340   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A
1. Introduction
Definition of a building, classification of buildings based on occupancy, requirements of a good residential building. Different parts of a building.

2. Foundations
Excavation in ordinary and hard soils, excavation in soft and hard rock, excavation in weak soils.
Concept of foundation and its purpose

(i)   Types of foundationsshallow and deep
(ii)   Shallow foundation – constructional details of : Spread foundations for walls, thumb rules for depth and width of foundation and thickness of concrete block, stepped foundation, masonary pillars and concrete columns. Raft foundation, combined footing, grillage foundation.
(iii)   Construction preparing foundation plans, setting out, ecxcavation and timbering.

3. Brick Masonry
Definition of terms: mortar, bond, facing, backing, hearting, column, pillar, plinth, plinth masonry, header stretcher, bed of brick, bat, queen closer, king closer, frog and quoin Bondmeaning and necessity: English bond only:1, 11/2 and 2 Brick thick walls in English Bond, T, X and right angled corner junctions. Thickness for 1, 11/2 and 2 brick square pillars in English Bond. Construction of Brick walls Method of having bricks in walls, precautions observed in the construction of walls, method of bonding new brick work with old (Toothing, raking back and block bonding) Principles and precautions to be observed in brick masonry Classification of brick masonry

4. Stone Masonry
Glossary of termsNatural bed, bedding planes, string course, corbel, cornice, block incourse, grouting, mouldings, template, throating, through stones, parapet, coping, pilaster and buttress. Types of Stone Masonry: Rubble Masonry: random and coarsed. Ashlar Masonry: Ashlar fine, Ashlar rough, Ashlar facing, specifications for coarsed rubble masonry, principles to be observed in construction of stone masonary walls

SECTION B
5. Walls
Purpose of walls Classification of walls—load bearing, dwarf, retaining, breast walls and dhaji walls partition walls, cavity walls, composite masonary walls. Classification of walls as per materials of construction: brick stone, reinforced brick, reinforced concrete, precast, hollow and solid concrete block and composite, masonary walls. Factor affecting thickness of walls, Partition walls, constructional details, suitability and uses of brick and wooden partition walls.

6. Mortars and Concretes
Preparation, use, average strength and suitability of cement, lime, lime cement, lime surkhi, mud mortar, Ingrdient of concrete, advantages of concrete, types and uses of concrete

7. Form Work and Scaffolding
Constructional details and suitability of mason's brick layers and tubular scaffolding. Form work for columns, walls, beams and slabs. Strutting and shoring and underpinning types and uses.

8. Damp Proofing
Dampness and its ill effects on bricks, plaster, wooden fixtures, metal fixtures and reinforcement, damage to asthetic appearance, damage to heat insulating materials, damage to stored articles and health, sources and causes of dampness Types of dampness—moisture penetrating the building from outside e.g. rain water, surface water, ground moisture Moisture entrapped during construction i.e. moisture in concrete, masonry construction and plastering work etc. Moisture which originates in the building itself i.e. water in kitchen and bath rooms etc. Damp proofing materials and their specifications: rich concrete and mortar, bitumen, bitumen mastic. Methods of damp proofing basement, ground floors, plinth and walls, special damp proofing arrangements in bathrooms, WC and Kitchen, damp proofing for roofs and window sills. Plinth protection and aprons.

SECTION C
9. Arches and Lintels
Meaning and use of arches and lintels. Glossary of terms used in arches and lintels—Abutment, arch ring, intrados, soffit extrados, voussoiers, springer, springing line, crown, key stone, skew back, span, rise, depth of an arch, haunch, spandril, bearing, thickness of lintel, effective span Arches

  (i)   Types of Arches—Semi circular, segmental, elliptivcal and parabolic, flat, inverted and relieving
  (ii) Stone arches and their construction
  (iii) Brick arches and their construction

10. Doors and Windows
Glossary of terms used in doors and windows. Doors—name, uses and sketches of metal doors, ledged and battened doors, ledged doors, collapsible doors, rolling steel shutters, side sliding doors, door frames, PVC shutters and metal doors. Windows—names, uses and sketches of metal windows, fully paneled windows, fully glazed windows, casement windows, fanlight windows and ventilators, sky light window rames, louvered shutters (emphasis shall be given for using metals and plastics etc. in piece of timber)

11. Roofs

Types of Roofs, concept of flat, pitched, hiped, arched and cell roofs Glossary of terms for pitched roofsbatten, eaves, barge, facia board, gable hiplap, purlin, rafter, rag bolt, valley, ridge Drainage arrangement for pitched roofs Drainage arrangement for flat roofs

12. Floors

Ground floors Glossary of termsfloor finish, topping, under layer, base course, rubble filling and their purpose Types of floor finishescastinsitu, concrete flooring (monolithic, bonded) Terrazo tile flooring, castinsitu, Terrazo flooring, Timber flooring, floor polishing equipment PVC floor, ceramic floor Upper floors Flooring on RCC Slab Flooring on RB Slab

SECTION D
13. Stairs

Glossary of terms: Stair case, winders, landing, stringer, newel baluster, riser, tread, width of staircase, hand rail, nosing Planning and layout of staircase: Relations between rise and going, determination of width of stair, landing etc. Various types of layoutstraight flight, dog ledgged, open wall, quarter turn. Half turn (new and geometrical stairs), bifurcated stair, spiral stair. Requirements of good stairs.

14. Surface Finishes

Plastering classification according to use and finishes like grit finish, rough cast, pebble dashed plain plaster etc., dubbling, proportion of mortars used for different plasters, reparation of mortars, techniques of plastering and curing. Pointingdifferent types of pointing, mortar used and method for printing. Paintingapplication of paints on wooden, steel and plastered wall surfaces. White washing, colour washing and distempering, application of cement and plastic paints. Commonly used water repellant for exterior surfaces, their names and application.

15. Building Planning

Site selection: Factors to be considered for selection of site for residential, commercial, industrial and public building. Basic principles of building planning, arrangement of doors, windows, cupboards, etc. for residential building. Orientation of building as per BIS: 7662 relation to sun and wind direction, rains, internal circulation and placement of rooms within the available area.

Note: An expert may be invited from field/industry for extension lecture
A field visit may be planned to explain and show the relevant things

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – III

BUILDING CONSTRUCTION

Sub. Code: DCE 340P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1. Demonstration of tools and plants used in building construction.

2. Layout of a building.

3. To construct brick bonds (English bond only) in one, one and half and two brick thick:

    (a)   Walls for L. T and cross junction

    (b)   Columns

4. Visit to construction site for showing the following items of works and to Write specific report about the works seen.

    (a)   Timbering of excavated trenching

    (b)   Damp roof courses

    (c)   Construction of masonry walls

    (d)   Flooring: Laying of flooring on an already prepared lime concrete base

    (e)   Plastering and pointing.

    (f)   White and colour washing

    (g)   Use of special type of shuttering/heavy machines in construction work

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – III

HYDRAULIC

Sub. Code: DCE 350   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A
1. Introduction
Fluid: Real fluid, ideal fluid
Fluid Mechanics, hydraulics, hydrostatics, hydrokinematics and hydrodynamics

2. Properties of Fluids:
Mass density, specific weight, specific gravity, cohesion, adhesion, viscosity, surface tension, capillary, vapour pressure and compressibility. Units of measurement

SECTION B
3. Hydrostatic pressure
Pressure, intensity of pressure, pressure head, pascal's law and its applications. Total pressure, resultant pressure, and center of pressure. Total pressure and center of pressure on vertical and inclined plane surfaces: Rectangular, triangular, trapezoidal,circular. Total pressure on dams and lock gates.

4. Measurement of Pressure
Atmospheric pressure, gauge pressure, vaccum pressure and absolute pressure. Piezometers, simple manometer, different manometer and mecha nical gauges. Measurement of pressure by manometers and pressure gauges.

SECTION C
5. Fundamentals of Fluid Flow:
Types of flow: Steady and unsteady flow, laminar and turbulent flow, uniform and non uniform flow. Discharge and continuity equation (flow equation) Types of hydraulic energy: Potential energy, Kinetic energy, pressure energy. Bernoulli's theorem; statement and description (without proof of theorem).

6. Orifice
Definition of Orifice, and types of orifices. Hydraulic coefficients. Large vertical orifices and small orifices. Free, drowned and partially drowned orifice. Time of emptying a rectangular/circular tanks with flat bottom.

SECTION D

7. Flow Through Pipes:
Definition, laminar and turbulent flow, explain through through Reynold's experiment. Reynolds number, critical velocity and velocity distribution. Head lose in pipe lines due to friction, sudden expansion and sudden contraction, entrance, exit, obstruction and change of direction (No dervation of formulae). Flow from one reservoir to another through long pipe of uniform and composite section. Water hammer phenomenon and its effects (Only elementary treatment). Pipes in series and parallel. Syphon.

8. Flow Through Open Channels
Definition of a channel, uniform flow and open channel flow. Discharge through channels using
(i) Chezy's formulae (no derivation)
(ii) Manning's formulae
Most economical sections
(i) Rectangular
(ii) Trapezoidal
(iii) Circular

9. Flow Measurements
Measurement of velocity by Pitot tube, current meter, surface float, velocity rods. Measurement of discharge by a notch
   (i)   Difference between notches and orifices.
   (ii) Discharge formulae for rectangular notch, triangular notch, trapezoidal notch and conditions for their use (no derivation).

Measurement of Discharge by weirs

   (i)   Difference between notch and weir.
   (ii) Discharge formulae for free, drowned and broad crested weir with and without end contractions; velocity of approach and condition of their use.
   (iii) Venturi fumes to measure flow.
   (iv) Measurement of discharge by velocity are a method

10. Hydraulic Machines
Reciprocating pumps Centrifugal pumps Impulse turbines Reaction turbines Sketching and description of principles of working of above mentioned machines.

HYDRAULIC

Sub. Code: DCE 350P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1. To verify Bernoulli's theorem

2. To find out venturimrter coefficient

3. To determine coefficient of velocity (Cv)., Coefficient of discharge (Cd), Coefficient of contraction (Cc) of an orifice and verify the relation between them

4. To perform Reynold's Experiment.

5. To determine Darcy's coeficient of friction of flow through pipes

6. To verify loss of head due to:

    (a) Sudden enlargement

    (b) Sudden Contraction

7. To determine velocity of flow of flow of an open channel by using a current meter.

8. To determine coefficient of discharge of a rectangular/triangular notch.

9. Study of the following:

    (i) Reciprocating pump or Centrifugal pump

    (ii) Impulse turbine or Reaction turbine

    (iii) Pressure Gauge/water meter/mechanical flow meter/ pitot tube.

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – IV

CIVIL ENGINEERING DRAWING I

Sub. Code: DCE 410   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

DRAWING No.1
Details of spread footing foundations for load bearing and non load bearing wall for given thickness of walls with the help of given data or rule of the thumb, showing offsets, position of DPC; details of basement showing necessary damp proofing. Detail of cavity wall.

DRAWING No.2
Plans of T and Corner junction of walls 1 Brick, 11/2 Brick and 2 brick thick in English and Flemish bonds brick pillars.

SECTION B

DRAWING No.3
Elevation, sectional plan and sectional side elevation of paneled and glaze d door flush door, steel windows and aluminium windows.

DRAWING No.4
Drawing plan, elevation of a small building by measurement.

SECTION C

DRAWING No.5
Detailed plan, elevation and section of a two bedroom residential building from a given line plan, showing details of foundations, roof and parapet.

DRAWING No.6
Detailed working drawing of a small double stories building on a given plot, keeping in view building eye laws, showing slooping roof or surface drainage plan and flooring details.

SECTION D

DRAWING No.7
Each student should be guided to trace any one of the drawings of sheet no 4,5 and 6 with waterproof ink.

DRAWING No.8
Each student should be required to take out ammonia print of the tracing made by him.

Note :
    a) All drawings should be as per BIS code and specifications in SI units
    b) Intensive practice of reading and interpreting building drawings should be given

CONCRETE TECHNOLOGY

Sub. Code: DCE 420   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

1. Introduction
Definition of concrete, brief introduction to properties of concrete, advantages of concrete, uses of concrete in comparision to other building materials.

2. Ingredients of Concrete
Cement
The chemical ingredients causing changes in properties, situations of use and special precautions in the use of following types of cements: Ordinary Portland cement, rapid handling cement, low heat cement , high alumina cement, blast furnace slag cement, quick setting, white and coloured cements, Portland pozzolana cement

Aggregates:
  (i)   Classification of aggregates according to source, size and shape
  (ii) Characteristics of aggregates: Particle size and shape, crushed and rounded aggregates, surface texture, specific gravity of aggregate; bulk density, water absorption, surface moisture, bulking of sand, deleterious materials in the aggregate;
  (iii) Grading of aggregates, coarse aggregate, fine aggregate; All in aggregate; fineness modulus; interpretation grading charts and combination of two aggregates Water:

Lime on the impurities as per IS; effect of excessive impurities an concrete, ascertaining the suitability of water with help of concrete cube test

3. Properties of Concrete:
Properties in plastic stage, workability, segregation, bleeding Properties of hardened concrete: strength, durability, impermeability, dimensional changes;

SECTION B

4. Water Cement Ratio:
Hydration of Cement, effect of water cement ratios on the physical structure of hydrated cement, water cement ratio law and the conditions under which the law is valid; internal moisture, temperature, age and size of specimen. Definition of cube strength of concrete, relations between water cement ratio and strength of concrete.

Use of CRRI charts and BIS codes.

5. Workability
Definition, phenomenon of workability, concept of internal friction, segregation and harshness; factors affecting workability; water content; shape, size and percentage of fineness passing 300 micron. Measurement of workability; slump test and compaction factor test; recommended slumps for placement in various conditions of placement.

SECTION C

6. Proportioning For Ordinary Concrete
Object of mix design, strength required for various grades from IS 456, preliminary test, cube test, proportionating for ordinary mixas prescribes by BIS and its interpretation. Adjustment on site for: Bulking water contents, absorption, workability, design datas for moisture, bulkage, absorption and suitable fine aggregate andcoarse aggregate ratio. Difference between ordinary and controlled concrete. Introduction to fines concrete.

7. Form Work
Concept of factors affecting the design of form work (shuttering and staging) Materials used for form work (including raw materials). Sketches of form work for column, beam and slab. Precautions to be taken before during and after RCC construction Stripping time for form work as per BIS (no problem on the design of form work) Removal of form work.

SECTION D

8. Special Concretes:
  (i)   New materials
        Materials for light weight concrete
        Flyash
        Materials for high strength concrete
        Accelerators and retarders
        Air entraining and set controlling agents
        Water reducing and set controlling agents
        Special bonding agents like epoxy
        Polymer concrete
  (ii)   Concreting under special conditions
        Cold weather concreting
        Under water concreting
        Hot weather concreting
        Special locations i.e. mass concreting, high strength concreting

9. Concrete Operations
Storing of cement: Storing of cement in warehouse Storing of cement at site Effect of storage on strength of cement Determination of warehouse capacity for storage of Cement Storing of Aggregate Storing of aggregate on site for maintaining uniformity of moisture and cleanliness Batching Batching of cement Batching aggregate by: Volume, using gauge box (farma) selection of paper gauge box Weight spring balances and by batching machines Measurement of water Mixing Hand mixing Machine mixingtypes of mixers, capacities of operation of moxers Transportation of Concrete Transportations with and situations of use of the following: pans, wheel, barrows, truck mixers, chutes, belt conveyors, pumps, tower

crane and hoists etc. Placement of concrete Prior preparation before placement; when put on natural soil, rocky base, specially prepared sub base (brick soiling and water bound macadam base), hardened concrete base, checking of form work, checking provision for joints Placement of concreteprecautions to be taken. Compaction Hard compaction, pavement, narrow and deep members Machine compaction compactiontypes of vibrators internal screed vibrators and form vibrators, methods of handling screed vibrators and immersion vinrators, suitability of concrete mixes for compaction with vibrators. Selection of suitable vibrators for various situations Finishing concrete slabs, floating and trowelling Curing Object of curing, method of curing, shading concrete works, covering surfaces with besian, gunny bags, sprinkle of water, ponding method and membrane curing, steam curing Recommended duration for curing and removal of form work Jointing Location of construction joints, treatment of construction joint before the concrete is poured, concreting at these points, expansion joints in concrete in buildings their importance and location

Note: A field visit may be planned to explain and show the relevant things

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – IV

CONCRETE TECHNOLOGY

Sub. Code: DCE 420P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1. To determine the compressive strength of Portland cement (IS269)
2. To determine flakiness index and elongation index of coarse aggregate (IS 2386Part I)
3. Field method to determine fine silt in aggregate.
4. Determination of specific gravity and water absorption of aggregate (IS2386part III for aggregates of size 40 mm to 10 mm)
5. Determination of bulk density and voids of aggregates ((IS2386part III)
6. Determination of surface moisture in fine aggregate by displacement method (IS 2383 – Part III)
7. Determination of particle size distribution of fine, coarse and all in aggregate by sieves analysis (grading of aggregate0
8. To determine necessary adjustment for bulking of fine aggregate by field method (IS 2383Part III)
9. Test for workability (slump test):
    (a)   To verify the effect of water, fine aggregate/coarse aggregate ratio and aggregate/Cement ratio on slump
    (b)   To test cube strength of concrete with varying water cement ratio
10. Compaction factor test for workability (IS: 1199)
11. Non destructive test on concrete
    (a)   Rebound hammer test
    (b)   Ultrasound test
12. Tests for compressive strength of concrete cubes for M15 or M20 grade

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – IV

STRUCTURAL MECHANICS

Sub. Code: DCE 430   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

1. Properties of Materials
Classification of materials, elastic materials, plastic materials, ductile materials, brittle materials. Tensile test, compressive test, impact test, fatigue test, torsion test.

2. Simple Stresses and Strains
Concept of stress, normal and shear stresses due to torsion Concept of strain, strain and deformation, longitudinal and lateral strain, poison's ratio, Volumetric strain Hooke's law, modulli of elasticity and rigidity, Bulk modulus of elasticity, relationship between the elastic constants. Stresses and strains in bars subjected to tension and compression. Extension of uniform bar under its own weight, stress produces in compound bars (two or three) due to axial load.Stressstrain diagram for mild steel, mechanical properties, factor of safety Temperature stresses and strains

SECTION B

3. Bending Moment and Shear Force
Concept of a beam and supports (Hinges, Roller and Fixed), types of beams: simply supported, cantilever, fixed and continuous beams Types of loads (point, uniformly distributed and varying loads) Concept of bending moment and shear force, sign conventions Bending Moment and shear force diagrams for cantilever, simply supported and over hanging beams subjected to concentrated, uniformly distributed and uniformly varying loads (B.M. and S.F. diagrams should preferably be drawn on graph paper. Relationship between load, shear force and bending moment, point of maximum bending moment and contraflexure.

4. Second Moment of Area
Concept of second moment of area, radius of gyration Theorems of parallel and perpendicular axes Second moment of area for sections of Rectangle, Triangle, Circle, Trapezium, Angle, Tee, I, Channel and Compound sections. (No derivation)

5. Bending and Shear Stresses
Theory of simple bending Application of the equation $M / I = \sigma / Y = E/R$ (No derivation is required) Moment of resistance, sectional modulus and permissible bending stresses in circular, rectangular, I, T and L sections; Comparision of strengths of the above sections.

SECTION C

6. Slope and Deflection
Necessity for determination of reflection Moment area theorems (no derivation) Computation of slopes and deflections using moment area theorems for:

   (a) Simple supported beam with UDL over entire span and concentrated load at any point
   (b) Cantilever with UDL over entire span and concentrated load at free end

7. Columns
Theory of columns, Euler, Rankine's and I.S. formulae.

SECTION D

8. Combined Direct and Bending Stresses
Concentric and eccentric loads, eccentricity Effect of eccentric load on the section, stresses due to eccentric loads, examples in the case of short columns. Effect of wind pressure on walls and chimneys; water pressure on dams and earth pressure on retaining walls their causes of failures and their stability.

9. Analysis of Trusses
Concept of a frame, redundant and deficient frame, End supports, ideal and practical trusses.

Analysis of trusses by:
   (i) Methods of joints
   (ii) Method of sections and
   (iii) Graphical method

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – IV

STRUCTURAL MECHANICS

Sub. Code: DCE 430P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1. Determination of yield stress, ultimate stress, percentage elongation and plot the stress strain diagram and compute the value of Young's modulus on mild steel
2. Determination of Young's modulus of elasticity for steel wire with Searl's apparatus
3. Determination of modulus of rupture of a timber beam
4. Determination of maximum deflection and Young's modulus of elasticity in simple supported beam with load at middle third
5. Verification of forces in a framed structure

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – IV

SURVEYING I

Sub. Code: DCE 440   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A
1. Introduction
Content of surveying, purpose of surveying, measurement slinear and angular, units of measurements classification of survey based on instruments. Instruments used for taking these measurement, Classification to survey based on instruments. Basic principles of surveying

SECTION B

2. Chain Surveying
Purpose of chain surveying, principles of chain surveying. Equipment used in chain surveying, chain types, ranging rods, arrows, pegs, cross staffs, Indian optical squaretheir construction and use.
Different operations in chain surveying
 (i) Ranging (Direct/indirect)
 (ii) Offsets (perpendicular/oblique)
 Changing (flat and sloping ground)
Conducting chain survey over an area, recording the field data, plotting the chain survey, conventional signs.
Obstacles in chain surveying
 (i) Errors in chain surveying
 (ii) Correction for erroneous length of cahin, simple problems on this.
Testing and adjustment of chain and Indian optical square.

SECTION C

3. Compass Surveying
Purpose of compass surveying, Construction and working of prismatic compass, use of peismatic compass: Setting and taking observations. Concept of :

 a) MeridianMagnetic and true
 b) BearingMagnetic. True and Arbitrary
 c) Whole circle bearing and reduced bearing
 d) Magnetic dip and declination

Local attractioncauses, detection, errors and correction, problems on local attraction, magnetic declination calculation of included angles in a compass traverse. Concept of a traverseOpen and closed. Traversing with a compassBy included end deflection and closed traverse, plotting a traverseBy included end deflection angles, concept of closing error, adjustment of traverse graphically by proportionate method.

SECTION D

4. Leve lling
Purpose of leveling, concept of a level surface, horizontal surface, vertical surface, daturn, reduced level and bench marks. Principle and construction of Dumpy and I.O.P. (Tilting) levels. Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis. Temporary adjustment: setting up and leveling, adjusting for parallax of Dumpy and I.O.P. level, Different leveling Concept of back sight, foresight, intermediate sight, station change point, height of instrument. Level book and reduction of levels by

(i) Height of collimation method and
(ii) Rise and fall method.

Arithmetic checks, problem on reduction of levels, fly leveling, check leveling and profile leveling (Lsection and Xsection), errors in leveling, and precautions to minimize them and permissible limits, reciprocal leveling, testing and adjustment of IOP level. Numerical problems.

Note : For various surveying equipment relevant Indian Standards should be followed

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – IV

SURVEYING I

Sub. Code: DCE 440P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1. Chain Surveying
(i)
Ranging a line
Chaining a line and recording in the field work
Testing and adjustment of chain
Taking offsetsperpendicular and oblique (with a tape only)
Setting out right angle with a tape

(ii)
Chaining of a line involving reciprocal ranging
Taking offsets and setting out right angles, with corss staff and Indian optical square

(iii)
Chain survey of a small area (field work and plotting)
Chaining a line involving obstacles to ranging

2. Compass Surveying
(v)
Study of prismatic compass
Setting the compass and taking observations
Measuring angles between the lines meeting at a point

(vi)
Traversing with the prismatic compass and chain a closed traverse (Recording and plotting by included angles)

3. Levelling
(vii)
Study of dumpy level and leveling staff
Temporary adjustments of a Dumpy level
Taking staff readings of different stations from the single starting and finding differences of level between them.

(viii)
Study of IOP level
Its temporary adjustments
Taking staff readings of different stations from the single starting and finding differences
of level between them.

(ix)
Longitudnal and cross sectioning of a road/ railway/canal
Setting a gradient by dump and IOP level

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – IV

IRRIGATION ENGINERING

Sub. Code: DCE 450P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

1. Introduction
Definition of irrigation
Necessisity of irrigation
History of development of irrigation in India
Types of irrigation
Sources of irrigation water

2. Rain Fall and RunOff
Definition of rainfall and runoff. Catchment area, Dicken's and Ryve's formulae
Types of rain gaugesAutomatic and nonautomatic
Stream gaugling

3. Water Requirement of Crops
Definition of crop season
Duty, Delta and Base Period, their relationship
Gross command area, culturable command area, Intensity of irrigation, Irrigable area
Water requirement of different crops of different cropsKharif and Rabi

SECTION B

4. Lift Irrigation
Types of wells shallow and deep well, acquifer types, ground water flow, construction of open wells and tube wells
Yield of an open/ tube well and problems
Methods of lifting water Manual and mechanical devices, use of wind mills

5. Canal Head works
Definition, object, general layout, functions of different parts of head works
Difference between weir and barrage

6. Flow Irrigation
Irrigation canals
Perennial irrigation
Different parts of irrigation canals and their functions
Sketches of different canal crosssection
Classification of canals according to their alignment
Design of irrigation canals Chezy's formulae, Meanings formulae, Kennedy's and Lecey's silt theories and equations, comparision of above two silt theories, critical velocity ratio Various types of canal lining Advantages and disadvantages

SECTION C

7. Regulatory Works
Functions and explanation of terms used
Cross and head regulators
Falls
Energy dissipators
Outletsdifferent types
Escapes

8. Cross Drainage Works
Functions and necessity of the following types: aqueduct, siphon, superpassage, level crossing, inlet and outlet
Constructional detail of the above

SECTION D

9. Dams
Earthern damstypes, causes of failure
Classification into masonry and concrete dams
Labelled cross section of gravity dam
Spillwaystypes and uses

10. Water Logging and Drainage
Definition, causes and effects, detection, prevention and remedies
Surface and subsurface drains and their layout

11. Tubewell Irrigation
Introduction, occurrence of ground water, location and command, advantages of tube wells
Tube wells, explanation of terms water table, radius of influence, depression head, cone of depression, confined and unconfined aquifers
Types of tube wells and their choicecavity, strainer and slotted type:
Method of construction boring, installation of well assembly, development of well, pump selection and installation and maintenance

CIVIL ENGINEERING DRAWINGII

Sub. Code: DCE 510P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

PUBLIC HEALTH ENGINEERING DRAWING
1. Drains and Sewers
Cross section of standard types of open drains (circular, vshaped and ushaped) with their foundations Cross section of earthe rn waere and RCC sewer pipes Cross sections of masonry sewers (circukar and egg shaped)

2. Traps. Manholes and Inspection chambers
Detailed section of floor trap and gully trap
Detailed plan and section of an inspection chamber
Detailed plan and section of a manhole for the given data

SECTION B
3. Septic Tank and Soak Pit
Detailed plan and crosssections of a domestic septic tank and soak pit for 10 users with details of open jointed pipes as per IS 2470 Part I

4. Bath Room and W.C. Connections
Cross section through the external wall of lavatories at ground and first floor showing the single and double pipe system and the connections of lavotary, bath, basin tapes, shower and towel rail
5. Draw the plan and section of a two bed roomed double storeyed residential buildings showing details of water supply and sanitary installation and drainage systems. Show the drainage and water supply upto the municipal systems on the site plan also.

6. Practice of reading water supply and sanitary engineering drawimgs

SECTION C

IRRIGATION ENGINEERING DRAWING
7. Typical Cross –Section of a channel
Typical cross section of an unlined channel in cutting, partly cutting and partly filling and fully in filling

8. Well and Tube Well Plan and crosssection of tube well with pump house

SECTION D
9. A.P.M. Outlet
Working plan and Lsection through an A.P.M outlet

10. Distributory Falls
Plan, cross section and Lsection of Central Design Office (CD)) type fall with details of wing wall, pitching. Flooring and toe wall

11. Syphon Aqueduct
Detailed crosssection and Lsection of a siphon aqueduct from a given data

12. Culvert
Plan and cross section of a simple culvert

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – V

ELEMENTS OF RCC CESIGN

Sub. Code: DCE 520   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

1. Introduction
Concept of Reinforced Cement Concrete

2. Reinforcement Materials
Various types of reinforcing materials Suitability of steel as a reinforcing materials Properties of different types of steel (mild steel, medium tensile steel and deformed bars)

3. Theory of R.C.C. Beams
Assumption in the theory of simple bending for RCC beam Flextural strength of a singly reinforced beam Position of Neutral axis, resisting moment of the section, critical neutral axis, concept of balanced, under reinforced over reinforced sections Shaer strength of singly reinforced RCC beam. Assumptions made, permissible shear stresses as per IS code of practice, actual average shear stresses in singly reinforced concrete beam, concept of diagonal stirrups and inclined bars, shear strength of a RCC beam section

SECTION B

4. Bond in RCC beams
Concept of bond local and average bond Permissible bond stresses for plain and deformed bars as per IS code of practice Minimum length of embedment of bars Actual bond stress in RCC Beams Bond length (standard hook, slice length as per IS code of practice) Loads and loading standards for beams as per IS_875 Design of singly reinforced concrete beam as per IS code of practice from the given data such as span, load and properties of materials used. Design of lintel Design of main/secondary beam for a RCC flat roof and floor Design of a cantilever beam/slab

5. Doubly Reinforced Concrete Beams
Doubly reinforced concrete beam and its necessity Strength of a doubly reinforced concrete beam section Design of a doubly reinforced concrete beam

6. RCC Slabs:
Structural behaviour of slabs under UDL Type of end supports Design of one way slab Design of two slab with the help of tables of IS:456

SECTION C

7. Reinforced Brick Work
Reinforced brick work and its use in slab and lintels Limitations of the use of RB work General principles of design of reinforced brick lintels and slabs Design of RB lintels and slabs Specifications for RB work construction

8. TBeams
Structural behaviour of beam and slab floor laid monolithically Rules for the design of Rbeams Economical depth of Tbeams, strength of T beams Design of simply supported Tbeams using IS code of practice

SECTION D

9. Columns:
Concept of long and short columns IS specifications for main and lateral reinforcement Behavior of RCC columns under axial load Design of Axially loaded short and long columns with hinged ends Design of Isolated footings

10. Basic Concept of Prestressed Concrete
Introduction of prestressed concrete, general theory, Linear post tensioninggeneral, post tensioning advantages to the design engineer and the contractor Linear post tensioning system, high strength post tensioned stands, parallel lay wire, high strength alloy steel bars Techniques of post tensioning general, special requirements for forming and false work, ducts and closures, placing of ducts or tendons, concreting, stressing procedure, grouting, protecting anchorage from corrosion Pretionsioninggeneral, pretensioning yards set up, forms for pretensioning structural elements. Special techniques of pretensioning Materials of prestressingcement, aggregates, concrete, admixtures, vibrations, curing light weight aggregates, high strength steel bars, high strength stand, stress relaxation, galvanization Codes specifications and inspection, manufacturers of prestressing equiment, specifications, sizes and costs

TRANSPORTATION ENGINEERING

Sub. Code: DCE 530   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A

HIGHWAYS
1. Introduction
Importance of highway transportation; Important organizations like Central Road Research Institute, Indian Roads Congress, Ministry of Surface Transport Functions of Indian Road Congress IRC classification of roads Organisation of state highway department

2. Road Geometrics
Glossary of terms used in geometrics and their importance: Right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation levels, camber and gradient Design and average running speed, stopping and passing sight distance Curve necessity, horizontal and vertical curves including transition curves and superelevation. Methods of providing superelevation Widening of roads on curves Use of IRC design tables and specifications for finding elements of road geometrics. Drawing of typical crosssections in cutting and filling on straight alignment and at a curve

3. Highway Surveys and Plans
Designation of topographic map, reading the data given on a topographic map Basic considerations governing alignment for a road in plain and hilly area Highway location; marking of alignment; Importance of various stages viz;

    a) Reconnaissance survey: Conduct reconnaissance and prepare reconnaissance report
    b) Preliminary survey: Object, Organising, conducting and informations to be collected
    c) Location survey
    d) Standards for preparing the highway plans as per Ministry of Surface Transport
    (MOST)

4. Road Materials
Different types of road materials in use; soil aggregates binders Function of soil as highway subgrade California Bearing Ratio; method of finding CBR value and its significance Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test and soundness test Aggregates: Availability of road aggregates in India, requirements of road aggregates as per IS specifications Binders: Common binders; cement bitumen and Tar, properties as per IS specifications penetration and viscosity test of bitumen, procedure and

significance, cut back and emulsion and their uses

SECTION B
5. Road Pavements
Road Pavement: Flexible and rigid pavement, their merits and demerits, typical crosssections, functions of various components Subgrade preparation: Setting out alignment of road, setting out bench marks, control pegs for embankment and cutting, borrow pits, making profiles of embankment, construction of embankment compaction, stabilization, preparation of subgrade, methods of checking Camber, gradient and alignment as per recommendations of IRC, equipment used for subgrade preparation. Flexible pavements: sub base necessity and purpose, stabilized sub base, purpose of stabalization

Types of stabalization
    a) Mechanical stabalization
    b) Lime stabalization
    c) Cement stabalization
    d) Fly ash stabalization

Base of Course
Preparation of base course: Prime coat, Tack coat
    a) Brick soiling
    b) Stone stoiling
    c) Metalling: Water bound macadam and bituminous macadams
Methods of construction as per Ministry of surface transport
Prime coat, tack coat, seal coat
Surfacing: Types of surfacing
    a) surface dressing
    b) (i) premix carpet
       (ii) semi dense carpet
    c) Bituminous concrete
    d) Grouting
Methods of constructions as per Ministry of Surface transport, specifications and quality control; equipment used.
Rigid Pavements:

Construction of concrete roads as per IRC specifications: Form laying, mixing and placing the concrete, compacting and finishing, cutting , joints in concrete pavement, equipment used

SECTION C
6. Hill Roads
Introduction : typical crosssections showing all details of a typical hill road in cutting, partly in cutting and partly in filling Landslides: Causes, preventions and control measures

7. Road Drainage
Necessity of road drainage work, cross drainage works Surface and subsurface drains and storm water drains. Location, spacing and typical details of side drains, side ditches for surface drainage. Intercepting drains, pipe drains in hill roads, details of drains in cutting embankment, typical cross sections

8. Road Maintenance
Common types of road failurestheir causes and remedies Maintenance of bituminous roads such as patch work and resurfacing Maintenance of concrete roadsfilling cracks, repairing joints, maintenance of shoulders (berms), maintenance of traffic control devices

9. Construction Equipment
Output and use of the following plant and equipments Hot mix plant and mix all battery Tipper, factors (wheel and crawler) scraper, bulldozer, drumpers, shovels, grader, roller, dragline. Asphalt mixer and tar boilers Road pavers

SECTION D
10. Railways
Different types of gauges and sections
Characteristics of Railway embankments
Concept of creep

11. Bridges
Different types of bridges
Components of a bridge
Bridge foundations

12. Tunnels
Necessity of tunnels
Methods of construction of tunnels in hard and soft rocks
Ventilation and drainage of tunnels

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – V

TRANSPORTATION ENGINEERING

Sub. Code: DCE 530P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1. Determination of the California bearing ratio (CBR) the subgrade soil (demonstration only)
2. Determination of penetration value of bitumen
3. Determination of softening point of Bitumen
4. Determination of impact value and crushing value of the road aggregate
5. Determination of abrasion value of road aggregate
6. Determination of ductility of bitumen
7. Determination of viscosity of tar / bitumen

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – V

SOIL AND FOUNDATION ENGINEERING

Sub. Code: DCE 540   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A
1. Introduction
Importance of soil studies in Civil Engineering Geological origin of soils with special reference to soil profiles in India :Residual and transported soil, Alluvial deposits. Lake deposits, dunes and loess, glacial deposits, conditions in which above deposits are formed and their engineering characteristics. Engineering classification of soils, comparision between sand and clay.

2. Physical Properties of Soils:
Constituents for soil, phase diagram for soil Definitions and meaning of void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weight, dry unit weight Simple numerical problems with the help of phase diagrams

3. Soils Classification and Identification
Particle size, shape and their effect on engineering properties of soil Gradation of soil particles and its influence on engineering properties Relative density and its use in describing cohesionless soils, Behaviour of cohesive soils with change in water content, Atterberg limitsdefinitions, use and practical significance Field identification test for soils BIS soils classification systems; basis, symbols, major divisions and sub divisions, groups, plasticity chart: procedure to be followed in classifying a given soil into a group

SECTION B
4. Flow of Water Through Soils:
Concept of permeability and its importance Darcy's law, coefficient of permeability, seepage velocity and factors affecting permeability Comparision of permeability of different soils as per BIS Measurement of permeability in the laboratory and in the field

5. Effective Stress: (Concept Only)
Stresses in subsoil Definition and meaning of total stress, effective stress and neutral stress Principle of effective stress Importance of effective stress in engineering problems

6. Deformation of Soils
Meaning, conditions/situations of occur rence with emphasis on practical significance of:
a) Consideration and consolidation settlement
b) Creep

c) Plastic flow
d) Heaving
e) Lateral movement

Definition and practical significance of compression index, coefficient of consolidation, degree of consolidation Meaning of total settlement, uniform settlement, different settlement and rate of settlement and their importance Settlement due to construction operations and lowering of water table Tolerable settlement for different structures as per Bis

SECTIONC
7. Strength Characteristics of Soils
Examples of shear failure in soils Factors contributing to shear strength of soils, Coloumb's law Determination of shearing strength dirct shear test and unconfined compression test. Brief idea about triaxial shear test,comparison between direct shear test and triausual test. Drainage conditions of test and their significance Stress and strain ciurve, peak strength and ultimate strength, their significance Discrepancies between laboratory and field tests.

8. Soil Compaction
Definition of compaction and its necessity Laboratory compaction test (light and heavy as per BIS) definition and importance of optimum water content, maximum dry density, moisture dry density relations for typical soils wit h different compactive efforts Field compaction: methods and equipment, choice of equipment Compaction requirements Compaction control; Density control, field density test. (sand replacement), moisture control, Proctor's needle and its use, thickness control, jobs of an embankment supervisor in relation to compaction Factors affecting compaction

SECTION D
9. Bearing Capacity
Concept of bearing capacity Definition and significance of ultimate bearing capacity safe bearing capacity and allowable bearing pressure Bearing capacity from building codes Factors affecting bearing capacity Concept of vertical stress distribution in soils due to foundation loads Plate load test and interpretation of its results, limitations of plate load test Bearing capacity by SPT and unconfined compression test Soil properties governing choice of foundation type Methods of improving bearing capacity of soil

10. Soil Exploration
Purpose and scope of soil exploration Undertaking planning of subsurface investigations Influence of soil conditions on exploratory programme Possibility of misjudgement of subsoil conditions Location, depth and spacing of exploration Influence of size of project and type of structure on exploratory programme Methods of soil exploration; Reconnaissance, Trial pits, borings, (Auger, wash, rotary percussion to be briefly dealt), SPT and dynamic con e penetration test (Brief description and information collected) Groundwater level measurement Sampling:undisturbed, distributive and representative samples; selection of type of sample; thin wall and piston samples; area ratio, recovery ratio of samples and their significance. Number and quantity of samples, resetting, sealing and preservation of samples. Presentation of soil investigation results

11. Foundation Engineering

Concept of hollow and deep foundation; types of shallow foundations and their suitability; Factors affecting the depth of shallow foundations; deep foundations, classification of piles according to function and material;, installation of concrete piles (under reamed, bored, compaced) and their suitability; load carrying capacity of piles; constructional features of pile foundations, well foundation

SOIL AND FOUNDATION ENGINEERING

Sub. Code: DCE 540P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1. Auger Boring and standard penetration test
   Identifying the equipment and accessories
   Conducting boring and SPT of a given location
   Collecting soil samples and their identification
   Preparation of boring log and SPT graphs
   Interpretation of test results

2. Extraction of Disturbed and Undisturbed Samples
   Extracting a block sample
   Extracting a tube sample
   Extracting a disturbed samples for mechanical analysis. Compaction and limit test
   Field identification of samples

3. Field Density Measurement (Sand Replacement and Core Cutter Method)
   Caliberation of sand
   Conducting field density test at a given location
   Determination of water content
   Computation and interpretation of results

4. Liquid Limit and Plastic Limit Determination
   Identifying various grooving tools
   Preparation of sample
   Conducting the test
   Observation soil behaviour during tests
   Computation, plotting and interpretation of results

5. Mechanical Analysis
   Preparation of sample
   Conducting sleeve analysis
   Computation of results
   Plotting the grain size distribution curve
   Interpretation of the curve

6. Laboratory Compaction Tests)Standard Proctor test)
   Preparation of sample
   Conducting the test
   Observing soil behaviour during test
   Computation of results and plotting
   Determination of optimum moisture and maximum dry density

7. Unconfined Compression Test
   Specimen Preparation
   Conducting the test
   Plotting the graph
   Interpretation of results and finding/bearing capacity

8. Direct shear test on sandy soil samples

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – V

SURVEYINGII & CAMP

Sub. Code: DCE 550   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A
1. Plane Table Surveying
Purpose of plane table surveying, equipment used in plane table survey:
Plane table Alidade (Plain and Telescopic) Accessories Setting of a Plane Table Centering Levelling Orientation Methods of plane table surveying Rediation, Intersection Traversing Resection Two Point Problem Three Point Problem Mechanical method (Tracing paper) Bessel's Graphical method Trial and error method Errors in plane table survey and precautions to control them. Testing and adjustment of plane table and alidade

2. Contouring
Concept of contours, purpose of contouring, interval and horizontal equivalent, factors affecting contour interval, characteristics of contours, methods of contouring: Direct and indirect, use of stadia measurements in contour survey, interpolation of contours, use of contour map. Drawing cross section from contour map; marking alignment of a road, railway and a canal on a contour map, composition of earth work and reservoir capacity from a contour map

SECTION B
3. Theodolite Surveying
Working of transit vernier theodolite, fundamental axes of a theodolite and their relation; temporary adjustments of a transit theodolite; concept of vernier, least count and reading a vernier; concept of transmitting, swinging, face, left face right and changing face, measurement of horizontal and vertical angles. Prolonging a line (forward and backward) measurement of bearing of a line; traveling by included angles and deflection angle method; traversing by stadia measurement, theodolite triangulation, plotting a traverse, concept of coordinate and solution of ommited measurements (one side affected), errors in theodolite survey and precautions taken to minimise them; limit of precision in theodolite traversing. Brief introduction to tacheometry and use of tacheometric tables

SECTION C
4. Curves:
Simple circular curves
Need and definition of a simple circular curve; Elements of simple circular curves Degree of the curve, radius of the curve, tangent length, point of intersection (Apex point), tangent point length of a curve, long chord deflection angle, Apex distance and

Midordinate. Setting out of simple circular curve:

a) By linear measurements only offsets from the tangents Successive bisection of arcs Offsets from the chord produced
b) By tangential angles using a theodolite

Transition curves
Need (centrifugal force and super elevation) and definition of transition curve, rerquirements of transition cur ves; length of transition curves for roads; by cubic parabola; calculation of offsets for a transition curve; setting out of a transition curve by tangential offsets only. Vertical curves Setting out of a vertical curve

SECTION D
5. Minor Instruments
Study and use of the instruments given below to be explained in addition to providing practice:

a) Abney level
b) Tangent clinometer
c) Proportionate compass
d) Ceylone Ghat Tracer
e) Pentagraph
f) Planimeter

Note:
a) For various surveying equipment relevant Indian standards should be followed
b) No sketch of the instruments may be asked in the examination

SURVEYINGII & CAMP

Sub. Code: DCE 550P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

1. Plane Table Surveying
Study of the plane table survey equipment Setting the plane table Marking the north direction Plotting a few points by radiation method Orientation by Trough compass Back sighting Plotting a few points by intersection method Traversing an area with a plane table (at least five lines) To plot the position of plane table station by solving:
a) Two point problem
b) Three point problem by

Tracing paper method Bessel's graphical method Trial and Error method Setting and checking grades with abney level. Setting and checking grades with Ceylong Ghat Tracer Use of proportionate compass for enlargement reduction of lines and areas of geometrical plane figures, volume of solids and drawing geometrical figures of required number of sides in a circle. Finding heights by Indian Pattern Clinometer (Tangent Clinometer) Enlargement/reduction of a plan by the use of pentagraph Use of planimeter for computing areas

2. Contouring
Preparing a contour plan by radial line method by the use of a Tangent Clinometer/ Tacheometer Preparing a contour plan by method of squares Preparing a contour plan of a Road/Railway track/ Canal by taking cross sections.

3. Theodolite:
Taking out the theodolite, mounting on the tripod and placing it back in the box Study of a transit vernier theodolite; temporary adjustment of theodolite Reading the vernier and working out the least count, measurement of horizontal angles by repetition and reitration Prolonging a line forward and backward Measurement of magnetic bearing Measurement of vertical angles and use of techeometric tables Running a closed traverse with a theodolite (at least five sides) and its plotting

4. Curves
Setting out of a simple circular curve with the given data by the following methods
    a) Offsets from the chords produced
    b) One theodolite method
Setting out a circular curve with transition length by linear measurements

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – VI

EARTHQUAKE RESISTENT BUILDING CONSTRUCTION

Sub. Code: DCE 610   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A
ELEMENTS OF ENGINEERING SEISMOLOGY
cause of earthquake, seismic wave, earthquake size (magnitude, intensity), classification of earthquake, seismic zoining map of India, static and dynamic loading, static and dynamic equilibrium, fundamental period

SECTION B
Seismic behavior of traditionally built construction of India.
Seismic performance during earth quake and mode of failure (out of plane failure, in plane failure, diaphragm failure, connection failure, non structural component failure).

SECTION C
Seismic provision of strengthening and retrofitting measure for traditionally built constructions.
introduction of IS : 4326:1993. IS: 13928:1993 & IS:13927:993 with certain clauses.

SECTION D
Common modes of Failure of Rainforced Conceret buildings
Horizontal & vertical irregularities identifications seismic damage in building components (columns, beams, slabs, infill wall, foundation etc.), ductile detailing as per IS13920.

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – VI

ELEMENTS OF STEEL STRUCTURAL DESIGN

Sub. Code: DCE 620   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A
1. Structural Steel and Sections:
Properties of structural steel as per IS: 226 and IS:197 Designation of structural steel sections as per IS handbook and IS:800 Concept of determinate and indeterminate structures

SECTION B
2. Structural Steel Connections:
Riveted connections, types of rivets, permissible stresses in rivets as per IS:800, types of riveted joints, specifications as per IS 800 for riveted joints, design of riveted joints for axially loaded members:, testing and inspection of riveted joints as per IS:800 Welded connections: Types of welds, permissible stresses in welds, types of welded connections, design of butt and fillet welded connections subjected to axial loads, testing and inspection of welded joints as per IS:800

SECTION C
3. Tension Members:
Permissible stresses in tension for steel, design of tension members as per IS:800 (flats, angles and fee sections only).

4. Compression Members:
Concept of buckling of columns, effective length and slenderness ratio, permissible stresses in comparision as per IS:800, strength of columns of single and built up sections with the help of table of permissible compressive stresses. IS specifications for design of angle, struts and axially loaded columns (no built up columns); use of tacking rivets Column base sketch of slab base and guesseted base, beam and column connections (no design)

SECTION D
5. Beams:
IS specifications for the design of simply supported steel beams including design of base plate at the ends (laterally restrained beams only), structural behaviour deflected shapes and function of various elements of a plate girder and freehand sketching of a plate girder and its elements

SYLLABUS
DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – VI

ESTIMATING AND COSTING

Sub. Code: DCE 630   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

SECTION A
1. Buildings
Introduction to estimating: Types of estimates, drawings to attached with these estimates, preparation of rough cost estimates Units of measurement and units of payment of different items of work Different methods of taking out quantitiescentre line into in/out methods Preparation of a detailed estimate, complete with detailed reports, specifications, abstract of cost and material statement for a small residential; building with a flat roof. Preparation of a detailed estimate, complete with detailed reports, specifications, abstract of cost and material statement for pitched roof with steel truss only

SECTION B
2. Analysis of Rates:
Steps in the analysis of rates for any item of work requirement of material, labour, sundries and contractors profit
Calculation of quantities of materials for:

   a) Plain cement concrete of different proportions
   b) Brick masonry in cement and lime mortar
   c) Plastering and pointing with cement mortar in different proportions
   d) White washing

Analysis of rates of the following items of work when the data regarding labour, rates of material and rates of labour is given

   a) Earth work in exacavation and filling with a concept of lead and lift
   b) Cement concrete in foundation
   c) Damp proof course.
   d) RCC and RB in roof slabs
   e) First class burnt brick masonry in cement mortar
   f) Cement plaster
   g) Cement pointingflush, deep pointing

SECTION C
2. Irrigation
Calculation of earth work for inclined channels with the help of drawings for different crosssections Preparation of detailed estimate for a brick lined distributory from a given section

3. Pubic Health
Preparation of detailed estimate for laying a water supply line (CI pipe) Preparation of detailed estimate for sanitary and water supply fittings in a domestic containing one set of toilets and septic tank Preparation of detailed estimate for laying a brick sewer

SECTION D
4. Roads:
Methods for calculating earth work using:

   i) Average depth
   ii) Average cross sectional area
   iii) Graphical method

Calculations of quantities of materials for roads in plains for given drawings Preparation of detailed estimate using the above quantities Detailed estimate of a single span slab culvert with return wing walls Calculation of quantities of different items of work for a masonry retaining wall from given drawings.

5. Valuation
Purpose of valuation, principles of valuation Definition of terms such as depreciation, sinking fund, salvage and scrap value Valuation of a building property by replacement cost method and rental return method. Method of calculation of standard rentconcept of capitalized value and years purchase

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DIPLOMA IN CIVIL ENGINEERIN
SEMESTER – VI

CIVIL ENGINEERING DRAWING IV

Sub. Code: DCE 640P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

Steel Structural Drawing

1. Preparation of a working drawing (elevation, plan, details of joints as ridge, eaves and other conections) for a riveted steel roof truss resting on a masonry wall with the given span, shape of the truss and the design data regarding the size of the members and the connections. Also calculate the quantity of steel for the truss.

2. Steel connections (a,b,c,d) riveted and (e) welded all unstiffened Beam to beam connections (Seated and franed) Beam to column (Seated and franed) Column base connections (Slab base and gusetted base) Details of column splices Connections of a steel bracket with flange of a column

3. Detailed drawing showing plan and elevation for a riveted plate girder with the given design data regarding the sizes of its parts, with details at the supports and connections of stiffeners, flange angles and cover plates with the web.

MAJOR PROJECT WORK

Sub. Code: DCE 650P   **Credits: 02**

Total Marks: 100   **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks   **University Examination: 60 Marks**

Some of the suggested project activities are given below

1. Setting up of an enterprise

2. Projects connected with repair and maintenance of civil works

3. Estimating and costing projects

4. Design of residential buildings including design of structural members

5. Project work related to quality control of materials, concrete and construction activities

6. Project work related to waste minimization and waste utilisation

7. Preparation of bar bending schedules and estimation of steel requirement

8. Survey Work

9. Valuation of buildings

10. Alignment of roads

11. Design of septic tanks

12. Design of water supply scheme for a locality

13. Design of flood water disposal system

14. Pollution prevention and control studies etc.