SYLLABUS
FIRST SEMESTER
CIVIL ENGINEERING

ENGLISH AND COMMUNICATION SKILLS-I (991001)

Reading Skills (18 Periods)
A. Literature: Prose
1. Vivekananda :Hinduism (1893 Chicago)
2. Gandhi : On Education (From Hind Swaraj)
3. Oliver Goldsmith - "The Man in Black"
4. R L Stevenson - "A Night Among the Pines" "
5. Booker T. Washington-"My Struggle for an Education"
B. Unseen Comprehension Passage. Preferably from popular newspapers and magazines.

II. Writing Skills(15 Periods)

Language
1. Parts of Speech
a) Noun
b) Pronoun
c) verb
d) Adjective
e) Adverb
f) Preposition, Articles
g) Conjunction
e) Interjection
2. Tenses
3. Translation of a simple passage from Hindi to English
4. Paragraph Writing: Expanding a simple idea into a paragraph.
5. Letter Writing:
a) Business Letters
b) Personal Letters
6. Vocabulary:
a) Synonyms
b)Antonyms
c)Homophones
d)One word substitution

III. Communication Skills (15 Periods)

a) Importance of Communication
b) Communication as a Process
c) Methods of Communication: Verbal and Nonverbal
d) Channels of Communication: Formal and Informal

PRACTICALS(15 Periods)

I. Phonetics
A. Introduction
B. Basic Sounds of English
1. Vowels and Consonants
2. Phonetic Transcription
3. Rules of Pronunciation
4. Problem Sounds
C. Syllables
D. Word Stress
II. Conversation: Basic Communication
A. Starting a Conversation
1. Greetings
2. Introducing Oneself
3. Introducing Others
4. Leave Taking
5. Thanking, Wishing Well
B. Conversation in a Context
1. Offering - Responding to Offers
2. Requesting - Responding to Requests
3. Congratulating
4. Expressing Sympathy and Condolences
5. Expressing Disappointments
6. Asking Questions - Polite Responses
7. Apologising - Forgiving
8. Complaining
9. Persuading
10. Warning
11. Asking for and Giving Information
12. Giving Instructions
13. Getting and Giving Permission
14. Asking for and Giving Opinion

APPLIED MATHEMATICS-I (991002)

Unit – I (Algebra) [25 Periods]

1.1- Value of nP & nC (Without proof), Binomial theorem-(without proof) for r r positive integral index (expansion, general term, middle term) and for any index (expansion).
1.2-Partial fractions- (linear factors, repeated linear factors, non reducible quadratic
factors only).
1.3-Determinants-Definition, Properties of determinants, Expansion of determinants
(of order 2 and 3), Solution of simultaneous equations using Cramer's rule (in 2 and 3 unknowns).
1.4-Matrices- Definition of matrix, addition, subtraction, multiplication of matrices (upto 3 order), singular and non singular matrices, Adjoint of a matrix, Inverse of a matrix by adjoint method (up to 3x 3 only).
1.5-Sets: Sets and their representation, Empty set, finite and infinite sets, equal sets,
subsets, power set, universal set, operation on sets, complement of set.

Unit – II (Trigonometry [15 Periods]

1.1-Review of ratios of some standard angles (0,30,45,60,90 degrees), T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T-Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2).

Unit – III (Complex Number) [10 Periods]

1.1 Definition of complex numbers,Real and imaginary parts,Polar and Cartesian form and their conversion,Conjugate,Modulus and argument of a complex Number,Addition,Subtraction,Multiplication,division of complex numbers.
1.2 De-Moiver's Theorem(Statement Only) related simple problems,rth root of unity.

Unit – IV (Differential Calculus) [30 Periods]

1.1- Function: Definitions of variables, constants, open & closed intervals.
1.2- Definitions & types of functions-simple examples.
1.3- Concept & definition of Limit.
1.4- Standard limits of algebraic, trigonometric, exponential & logarithmic functions- simple problems. Examine the Continuity of a function at any point (simple problem only).
1.5 Examine the continuity of a function at any point(Simple Problam Only)
1.6-Differentiation by (first principal) or by definition of differention xn, sin x, cos x, tan x, ex, log x only . a
1.7-Differentiation of sum, product and quotient of functions. Differentiation of function of a function.
1.8-Differentiation of trigonometric inverse functions. Logarithmic differentiation. Exponential differentiation, Successive differentiation (up to third term only).
1.9-Application (a) Maxima and minima (b) Equation of tangent and normal to a curve (for explicit functions only) (c) L' Hospital rule for solving in in determinate form (0/0,)

APPLIED PHYSICS-I (991003)

Unit-I : Measurement and Errors (06 Periods)

Definition of Physics, Fundamental forces in nature, Physical quantities
Units - fundamental and derived units, systems of units (FPS, CGS, MKS and SI units)
Dimensions of physical quantities.
Error in measurement; types of errors, random and systematic errors, propagation of
errors, significant figures.

Unit-II Force and Motion (14 Periods)

Force: Newton's laws of motion, Types of inertia and its examples.
Linear momentum and conservation of linear momentum, impulse and its applications,
simple numerical problems in brake system of vehicles and trains etc.
Lever and its uses
Concept of Scalar and Vector quantities – examples, types of vectors.
Resolution and Composition of vectors, Vector multiplication (scalar product and vector product of two vectors) and its physical significance, addition of vectors (Parallelogram law)
Friction: Types of friction and its applications.
Circular motion: Angular displacement, angular velocity and angular acceleration
Relation between linear and angular velocity,linear and angular acceleration
Centripetal force (derivation) and centrifugal force with application such as banking of
roads and bending of cyclists
Applications of various forces in lifts.

Unit-III : Rotational Motion (06 Periods)

Concept of translatory and rotatory motion with examples Definitions of torque, angular momentum and their relationship
Conservation of angular momentum (qualitative) and its examples
Moment of inertia and its physical significance, radius of gyration, Theorems of parallel and perpendicular axes (statements), Moment of inertia of rod, disc, ring and sphere (Formulae only).

Application of rotational motion in transport vehicles, trains and aeroplane turbine/engine.

Unit-IV : Work, Power and Energy (08 Periods)

Work: definition and its SI units
Work done in moving an object on horizontal and inclined plane (incorporating frictional forces) with its application
Power: definition and its SI units, calculation of power with numerical problems
Energy: Definition and its SI units: Kinetic energy and Potential energy with examples and their derivation
Work -Energy Theorem
Principle of conservation of mechanical energy (for freely falling bodies), transformation of energy from one form to another with its application

Unit-V : Properties of Matter (10 Periods)

Elasticity: definition of stress and strain, different types of modulus of elasticity, stress – strain diagram, Hooke's law with its applications. Engineering applications of Elasticity
Pressure: definition, its units, atmospheric pressure, gauge pressure, absolute pressure. Pascal's law (concept only). Bernoulli's Theorem (concept and examples only).
Surface tension: concept, its units, angle of contact, measurement of surface tension
by capillary tube method, applications of surface tension, effect of temperature and impurity on surface tension
Viscosity and coefficient of viscosity: Stoke's Law and terminal velocity, effect of temperature on viscosity.

Unit-VI : Thermometry (08 Periods)

Difference between heat and temperature
Principles of measurement of temperature and different scales of temperature and their relationship
Types of thermometers (Concept only)
Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them
Modes of transfer of heat (Conduction, convection and radiation with examples), Coefficient
of thermal conductivity

Engineering Application of conduction, convection and radiations.

Unit-VII : Waves and Vibrations (12 Periods)

Simple Harmonic Motion (SHM): definition, expression for displacement, velocity,
acceleration, time period, frequency and Energy in S.H.M. Time period of Simple
pendulum.
Wave motion: transverse and longitudinal wave motion with examples,
Equation of simple harmonic progressive wave
Sound and Light waves, velocity, frequency and wave length of a wave, Musical
Sound
and Noise
Free, forced and resonant vibrations with examples
Acoustics of buildings – reverberation, reverberation time, echo, coefficient of
absorption of sound, methods to control reverberation time and their applications
Ultrasonic – production (Magnetostriction and piezoelectric methods) and their
engineering and medical applications.

LIST OF PRACTICALS (Perform minimum Six experiments)

1. To find the Least count of given different measuring equipments (eg. voltmeter,
ammeter, stop watch, vernier callipers etc).
2. To find the diameter of wire using a screw gauge
3. To find volume of solid cylinder and hollow cylinder using a vernier callipers
4. To determine the radius of curvature using a Spherometer
5. To find the time period of a simple pendulum and determine the length of
second's
pendulum.
6. To verify parallelogram law of forces
7. To determine the viscosity of given liquid by Stoke's method
8. To determine the coefficient of friction on horizontal plane.
9. To determine the Young's Modulus by Searle's apparatus
10.To determine force Constant of spring using Hooke's Law.

APPLIED CHEMISTRY-I (991004)

1. Atomic Structure (03 Periods)

1.1 Fundamental particles i.e. electron, proton and neutron, their characteristics (discovery is not included)

1.2 Electronic configuration of elements (up to Z = 30) with special reference to Aufbau principle, Pauli's exclusion principle, Hund's Rule and Haisenberg's uncertainity Principle.

1.3 Atomic mass, molecular mass and Equivalent mass with numerical problems.

2. Chemical Bonding (05 Periods)

2.1 Introduction, concept of valency, Octate rule Types of chemical bonding electrovalent, covalent and coordinate bond formation giving suitable examples to each and lewis dot structure.

2.2 Hydrogen bonding and its effect on physical properties of the compounds.

3. Classification of Elements (04 Periods)

3.1 Morden periodic law, long form of periodic table.

3.2 Study of periodicity in physical and chemical properties with special reference to atomic and ionic radii, ionization potential, electron affinity, electro negativity .

3.3 Variation of effective nuclear charge in a period and metallic character.

4. Water Treatment (16 Periods)

4.1 Source of water Hard and soft water, hardness of water and its causes, disadvantages of hard water i) domestic use (ii)in industrial use, units of hardness, sludge and scale formation caustic embrittelment, boiler corrosion, foaming and priming in boilers.

4.2 Softening of water (i) Hot and cold Soda Lime process (ii) Permutit Process (iii) Ion-Exchange resin process. Simple numerical problems related to soda lime process.

4.3 Internal treatment of water carbonate conditioning, phosphate conditioning,

colloidal conditioning, calgon conditioning.
4.4. Determination of hardness of water by (i) O'Hehner's Method (ii) E.D.T.A.
Method
4.5 Qualities of water used for drinking purposes, treatment of river water to make it fit for town supply Disinfection of water by chlorination process.

5. Solutions (12 Periods)

5.1 Concept of solution and classification of solution. Definition of solute and solvant, brief introduction of the terms Ionization, Acidity, Basicity, equivalent weight and gram equivalent weight with suitable examples
5.2 Strength of a solution (i) Normality (ii) Molarity (iii) Molality as applied in relation to a solution with simple numerical problems related to these terms
5.3 Buffer solutions , indicators and it's theory. Solubility Product.
5.4 Definition of pH, and different industrial applications of pH, determination of pH of a solution with the help of pH meter including simple numerical problems.

6. Electrochemistry (12 Periods)

6.1 Definition of the terms: Electrolytes, Non-electrolytes conductors and non conductors with suitable examples, Arrhenius theory of electrolytic dissociation.
6.2 Faraday's Laws of Electrolysis with simple numerical problems
6.3 Different industrial applications of 'Electrolysis' with special reference to electroplating, electrorefining and electrometallergy.

7. Catalyst (04 Periods)

7.1 Definition of catalyst, type of catalyst and catalyses.
7.2 Characteristics of catalytic reaction.
7.3 Theory of Catalyses & mechanism of catalyses.

8. Environmental Chemistry (08 Periods)

8.1 General concept of pollution and pollutants and type of pollution.
8.2 Factor effecting air, water, noise and soil pollution with special major to control
of air and water Pollution.
8.3 Green house effect , ozone layer depletion, global warming , Acid rain and smog.

LIST OF PRACTICALS

1. Study of apparatus used in Volumetric analysis with digram.
2. Preparation of standard solution of oxalic acid or potassium dichromate or sodium
hydroxide.
3. To analyse the two acidic and two basic radicals in the inorganic mixture from the
following radicals
a) Acidic Radicals Co --, SO4- -, NO3 -, CH3 COO -, Cl-, Br-, I- 3
b) Basic Radicals NH4++, Pb+, Cu++, Cd++, As+++, Sb+++, Sn++, Al+++,
Fe+++, Cr+++, Mn++, Ni++, Co++, Zn++, Ba++, Ca++ and Mg++,
4. Determine the degree of temporary hardness of water by O'Heher's method.
5. Estimation of total hardness of water by complexometeric titaration method.
6. Determine pH of a given sample by using pH meter
7. Determination of solubility of a solid at room temperature
8. Demonstration – Application of FeCl in etching process for designing circuits on
3
PCB (Printed Circuit Board)

COMPUTER FUNDAMENTALS (991005)

Unit -1 Computer Introduction (06 Periods)

Introduction about the Data and information, Data Processing definition of computer, Block diagram of Computer System, Components of Computer, Classification of Computer (Analog and Digital), Computer Generation, Characteristics and Applications of Computer, Input and Output Devices, Printer - Inkjet & Laser Printer, Memory- Primary Memory (RAM, ROM, PROM, EPROM EEPROM & UVEPROM, Secondary Memory Devices (Hard Disk, Optical Disk, PEN Drive, OTG, Magnetic Tape) and Memory Tree, CPU Types, Level of Programming Languages, Overview of Instruction, Program, System Software and Application
Software.

Unit -2: Number System (06 Periods)

Binary, BCD, Grey Code, 3 Excess Code, Octal, Decimal, Hexadecimal Number System, Conversion of Numbers- Decimal to Binary, Decimal to Octal, Decimal to Hexadecimal, Binary to Octal, Binary to Hexadecimal, Octal to Hexadecimal, Hexadecimal to Octal, Floating Point Numbers, Addition and Subtraction of Binary Numbers.

Unit -3 Operating System (04 Periods)

Operating System- Definition, Goals and Responsibilities, Window based Operating System, Open Source based Operating System, Single User and Multiuser Operating System, Multi Programming and Real Time Operating System, GUI V/s CUI, Commands of MS DOS (Create, Read, Edit, Display, Copy, Move, Rename and Delete Operations on Files and Directory).

Unit -4 Networks & Internet (04 Periods)

Definition of Network, LAN, MAN, WAN, Network Devices, Tools and cables (Switch, Router, Modem, RJ45, CAT Cable, OFC, LAN Tester, Crimping Tool) Network Topology, Protocols (HTTP, URL, FTP), Internet, ISP, Web Browser and web server, Email, www, Search Engine.

Unit –5 Office Application (08 Periods)

Word- Create, Open, Save, Update Files, Word Art, Clip Art, Insert Images, Header & Footer, Table (Insert, Merge, Split Cells, Border & Shading), Page

Layout, Page Setup- Margin, Orientation, Page Background- Watermark, Page Border, Paragraph- Indent, Spacing and Text Alignment, Text Formatting- Text Alignment, Sorting, Find & Replacement, Bullet & Numbering.
Excel- Worksheet, Formatting Cells, Insert Data Patterns Instantly, Format Painter, Hide Rows & Columns, Charts in Excel, Border & Shading, Sort & Filter, Find & Replace, Page Preview & Printing, Formulas, Calculation Sheet, Copy Formula OR Data Between Worksheets, Header &Footer.
PowerPoint – Create Slide, Design Patterns, Animation & Effects in slides, Slide Show.

UNIT-6 Role Of IT (4 periods)

Information Technology- Information, Scope and role of Information Technology, Overview of Cyber Laws & IT Act, Ecommerce, e-Governance, National Informatics Centre, Payment Gateway, Overview of Net-Banking- NEFT & RTGS, Mobile Banking (SBI Buddy, RuPay, UPI, BHIM, e-Wallet), Introduction of Geographic
Information System, Uses of GIS in Engineering, Optical Codes (MICR, OMR, Barcode, QR Code), Impact of computer on society, Applications of IT.

List of Practical's

1. Working with Windows Latest Version- desktop, start icon, taskbar, Recycle Bin, My Computer and Control panel.
2. Exercise on Printing, Installing a printer driver, Setting up a printer , Default and installed printers, Controlling print queues, Viewing installed fonts, The clipboard and drag and drop.
3. Exercise on Text Formatting in Word document with Paragraph formatting, Bullets, page border and numbering, creating and using macros in a document.
4. Exercise on Page formatting, Page margins, Page size and orientation, Page breaks, Headers and Footers, Introducing tables- Rows and Columns.
5. Exercise on Development of application using mail merge, Mail merging addresses for envelopes and letter, printing addressed envelope and letter.
6. Formatting and customizing data, Formulas, functions and named ranges, creating, manipulating & changing the chart type in Spreadsheet.
7. Exercise on Preparing Presentation Slides- Opening and saving a presentation, Inserting Images, Slide show timings, Animation effects.
8. Exercise on Connecting to the Internet, Searching the Internet, Commonly used search engines, writing email, finding an e-mail address, Using electronic mail.
9. Exercises on External and Internal Commands of MS DOS.
10. Create Business Cards using Shapes, text, and color.

ENGINEERING GRAPHICS-I (991006)

Unit 1. Drawing Office Practice, Lines & Lettering (2 Sheets)(06 Periods)

Graphics instruments and their uses, Sizes and layout of standard graphic sheets and
graphic boards, Different types of lines in engineering graphics as per BIS specifications Free hand lettering (alphabet and numerals) lower case and upper case,
single stroke vertical and inclined at different standard series of 2.5, 3, 5, 7, 10, and 15 mm heights.

Unit 2: Dimensioning (2 Sheets) (06 Periods)

Necessity of dimensioning, Types of dimensioning (chain, parallel and progressive dimensioning) size and location dimensioning Methods of placing dimensioning (Aligned and unidirectional system), use of leader lines. General principles of dimensioning, Dimensioning of overall sizes, circles, thread holes, chamfered surfaces, angles, tapered surface holes equally spaced on PCD, counter sunk hole counter bored holes, cylindrical parts, narrow space and gaps, radii, curves and arches.

Unit 3: Geometrical Constructions (4 Sheets) [(12 Periods)

Simple geometrical Constructions; Constructions of regular polygons (triangle, square, pentagon, hexagon) and circle, Ellipses (concentric circle method and Intersecting Arcs method ,Directrix and focus method), Parabola (rectangle and tangent method, Directrix and focus method) Hyperbola (Directrix and focus method, Transverse axis and focus method), Cycloids, Epicycloids, Hypocycloids, involutes of regular polygons and circles , Helix: (conical, parallel, Spiral).

Unit 4: . Scale (2 sheets) (12 Periods)

Scale – their need and importance, Definition of representative fraction (R.F),find RF of given scale , Construction of plain and diagonal scales.

Unit 5: Principle of Projections (6 sheets) (15 Periods)

Principle of orthographic projection and introduction to first angle projection and third angle projection, Projection of points situated in different quadrants, Projection of lines, Lines inclined to one plane and parallel to the other and vice versa (all quadrants); Line inclined to both reference planes (HP and VP) and limited to both ends in same quadrant. Projection of Planes triangular, square, rectangular, pentagonal, hexagonal and circular) ,Planes perpendicular to one refrence plane and parallel to other, planes inclined to one refrence plane and perpendicular to other or vice versa (1st& 3rd quadrants), Projection of solids, such as Prism, ,Pyramid
(triangular, square, rectangular, pentagonal hexagonal), Cone, Cube, Cylinder Tetrahydron, Frustum with axis perpendicular to one refrence plane and axis inclined to one refrence plane and parallel to other refrence plane. Orthographic views of given pictorial views (1st and 3rd angle).

Unit 6. Isometric Projections (2 sheets) (15 Periods)

Fundamentals of Isometric projections/views (Theoretical instructions) and Isometric
Scales , Isometric views/projections of different types of planes, Isometric views/projections of different types of solids , Isometric views/projections of combination of regular solids like cylinder, cone, cube, prism and pyramid, Conversion of Isometric views from given Orthographic projections.

Unit 7. Symbols and Conventions (2 sheets) [(15 Periods)

Civil engineering sanitary fitting symbols , Electrical fitting symbols for interior installations, Electronic symbols

GENERAL WORKSHOP PRACTICE-1 (991007)

1. INTRODUCTION TO WORK SHOP(20 Periods)

1.1 General Safety rules of workshop
1.2 State the General Safety Measures to be observed in Workshop.
1.3 State the General housekeeping activities.
1.4 Prepare a list of general safety Rules to be followed in Workshop.

2. FITTING SHOP(40 periods)

2.1 Layout of Shop
2.2 Sketch & Label Details of shop Layout
2.3 Type of jobs produced in fitting shop
2.4 Understand the functions of fitting shop
2.5 Understand different Metals, Alloys & their Sections
2.6 List the Commonly used Metals, Alloys.
2.7 State at least Five Sections, Shape & Size of Metals, Alloys.
2.8 Use relevant IS Code for commonly used materials with their samples of different Cross sections.
2.9 Fitting tools.
2.10 Know use of fitting tools, sketch various tools & label their parts.
2.11Classify fitting tools as marking tools, Clamping devices, striking tools, cutting
tools etc.
2.12 Know the marking out & inspection instruments such as surface plate, marking
block, scriber, tri square, Bevel protractor etc.
2.13 Fitting operation :- Use of Various fitting tools, inspection & measuring Instruments to produce given jobs.
2.14 Choose correct Shape & Size of Blank metal for a given drawing.
2.15 Marking as per drawing using correct method, tools & sequence.
2.16 Choose correct sequence of operations for the job viz. Sawing, filing, scraping,
drilling & Tapping
2.17 Select appropriate Tools, inspection and measuring instruments.
2.18 Clamping the job in correct position in an appropriate clamping device.
2.19 Perform the operation with appropriate body posture, method & precision, exercising personal judgment of need of the force.
2.20 Inspect the job as and when necessary.

2.21 Introduction to screw threads.
2.22 Know common types of screw threads & the terminology used.
2.23 Sketch and label details of Metric & Whitworth thread.

3. CARPENTRY SHOP (40 Periods)

3.1 Carpentry shop lay out.
3.2 Sketch & Label Details of shop Layout.
3.3 Type of jobs produced in carpentry shop.
3.4 Understand the functions of carpentry shop.
3.5 Introduce type of jobs produced by carpenter.
3.6 Commonly used raw materials
3.7 Know commonly used raw materials &their commercially available size.
3.8 Name various type of raw materials used such as Timber: - logs, planks, battens
etc. Ply, Teak ply, block board, sun mica, Formica etc.
3.9 Carpentry tools: - Know various carpentry tools with their specifications and uses e.g. Different saws, chisels, Files, gauges, scales, hammers, tri squares, planners, vice etc.
3.10 Carpentry Joints Introduction of various joints like T, corner, mortise & tennon joints, dovetail, pin, cross half lap joint, etc.
3.11 Choose correct shape &size of timber blank for a given job drawing.
3.12 Do marking as per drawing using correct method, tools &sequence.
3.13 Identify correct operations e.g. sawing, chiseling, planning, grooving etc.
3.14 Select appropriate Tool , inspection & measuring Instruments.
3.15 Clamping the jobs in correct position in an appropriate clamping device.
3.16 Perform the operation with appropriate body posture, method & precision, exercising personal judgment of need of the force
3.17 Inspect for size & quality of finish as and when necessary.
3.18 Assemble the components produced. Inspect for proper joint quality &take remedial steps.

4. ELECTRIC SHOP (28 Periods)

4.1 Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses, ceiling roses, PVC Conduits, PVC Channels and allied items, tools along with electrical instruments such as voltmeter, ammeter and multimeter
4.2 Study of electrical safety measures and demonstration about use of protective devices such as fuses, MCBs, ELCBs and relays including earthing
4.3 Identification of phase, neutral and earth of domestic appliances and their

connection to two pin/three pin plugs.

4.4 Preparation of a house wiring circuit on wooden board using fuse, switches, socket, holder, ceiling rose etc. in PVC conduit and PVC casing and capping wiring system

4.5 Study of common electrical appliances such as electric iron, electric kettle, ceiling fan, table fan, electric mixer, electric Geyser, gas geyser, desert cooler, Heater, refrigerator, water purifier

4.6 Introduction to lead-acid battery, identification of parts and its working.

4.7 Installation of inverter with battery and to connect two or more batteries in series
and in parallel (knowledge of a.c. and d.c.)

4.8 Charging of a battery and testing it with the help of hydrometer and cell tester.