2.1   COMMUNICATION SKILLS - II

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RATIONALE

Language is the most commonly used and effective medium of self-expression in all spheres of human life – personal, social and professional. A student must have a fair knowledge of English language and be able to pursue the present course of study and handle the future jobs in industry. The objective of this course is to assist the diploma holders to acquire proficiency, both in spoken (oral) and written language. At the end of the course, the student will be able to develop comprehension, improve vocabulary, develop grammatical ability, enhance writing skills, correspond with others, enhance skills in spoken English.

DETAILED CONTENTS

1.   Prose Text Book   (12 hrs)

The following six chapters of A Book of English for Polytechnics – Prose Selection, Published by MacMillan India Ltd., on behalf of Technical Teachers' Training Institute, Chandigarh

   a)   Uncle Podger Hangs a Picture
   b)   Subash Chandra Bose
   c)   A Pair of Mustachios
   d)   Guru Gobind Singh
   e)   With The Photographer
   f)   Sir Jagdish Chandra Bose

There will be one general question from one of these six chapters.

2.   Precise writing (selected from the prescribed 6 chapters of Prose Text Book)
                                                                   (4 hrs)

3.   Grammar   (2 hrs)
      Antonyms change of words into different parts of speech

4.   Correspondence   (10 hrs)

   a)   Business letters such as:
         ➢   Registration as supplier
         ➢   Floating quotations and tenders
         ➢   Quarry for product specification, price and other details etc from a firm/Company
         ➢   Covering letter for quoting prices against a quotation/tender
         ➢   Placing supply order

    b)   Personal letters such as:

- Application for leave and extension of leave
- Application for seeking a job/employment
- Conveying congratulation messages to a relative/friend/colleague on different occasions
- Conveying condolence message to a relative/friend/colleague
- Request letter to guardian for sending money for excursion/study tour
- Letter to your brother/sister/friend describing your first day experience in the polytechnic

    c)   Official letters such as**:**

- Letter to editor for placing an advertisement in the newspaper for purchase/selling of goods
- Letter to Municipal Commissioner for improving water supply/ sanitation system in your locality
- Letter to General Manager, Telephone Department for restoring a dead telephone/shifting a telephone
- Letter to State Electricity Board for repair of street lighting/ correction of bills etc.
- Letter to the supplier for rectifying or replacing a defective machinery/item of purchase
- Letter to Registrar, State Board of Technical Education for allowing to improve grades/marks in diploma examination

5.   Report Writing   (2 hrs)

- Drafting a technical report of a visit to a factory, construction site, modern office, etc.
- Report writing on current general themes/topics related to economy, industry, social issues
- Elements of periodical progress report

6.   Inspection Note   (2 hrs)

- Write an inspection note after inspecting technical/industrial goods
- Write an inspection note after visiting a construction site or production shop

7.   Writing "Preface" and "acknowledgement" of a project report   (2 hrs)

8.   A paragraph on current topics/themes   (2 hrs)

- ➢ Technology
- ➢ Science
- ➢ Economy
- ➢ Politics
- ➢ Social
- ➢ General

9.   Vocabulary   (2 hrs)
- ➢ words, idioms, phrases, antonyms and synonyms
- ➢ Translation of 100 most popular administrative terms from English to Hindi and from Hindi to English

10.   Drafting   (4 hrs)
- ➢ Press notes
- ➢ Memos/circulars
- ➢ Notices (lost and found: obituary/auction, etc)
- ➢ Telegrams
- ➢ Press releases
- ➢ Agenda and minutes of the meeting
- ➢ Personal resume/curriculum vitae

11.   Communication Techniques   (6 hrs)
- ➢ Importance of communication
- ➢ Types of communication – verbal and non-verbal
- ➢ One way and two way communication
- ➢ Process of communication – horizontal, vertical, upward, downward
- ➢ Essentials of good communication
- ➢ Level of communication – inter and intra personal, group to person, group to group
- ➢ Methods of effective oral, written and non-verbal communication, Horizons – tone, frequency, rate, volume, depth
- ➢ Barrier to communication and over coming barriers
- ➢ Listening skill
- ➢ Use of audio visual aids for effective communication

LIST OF PRACTICALS

1.   Presentation of Technical Report, using Audio-visual aids

2.   Preparation and Presentation on a Seminar of a given topic/theme using power-point

3.   Telephonic conversation – Conveying and Receiving

4.   Mock Exercises for an interview for a job/employment

5. Listening comprehension from a radio/cassette talk in English

6. Extempore speech

7. Oral presentation with stress on proper body language, voice modulation

Note: For reading comprehension, listening comprehension and effective speaking skills, English Language Laboratory Manual and Workbook published by State Board of Technical Education, Hyderabad (AP) may be used along with text book

RECOMMENDED BOOKS

1. Essentials of Business Communication by Pal and Rorualling; Sultan Chand and Sons

2. The Essence of Effective Communication, Ludlow and Panthon; Prentice Hall of India

3. New Design English Grammar, Reading and Writing Skills by AL Kohli (Course A and course B), Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,

4. New Design English Reading and Advanced Writing Skills for Class XI and XII by MK Kohli and AL Kohli; Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,

5. A Practical English Grammar by Thomson and Marlinet

6. Spoken English by V Sasikumar and PV Dhamija; Tata McGraw Hill

7. English Conversation Practice by Grount Taylor; Tata McGraw Hill

8. Developing Communication Skills by Krishna Mohan and Meera Banerji; MacMillan India Ltd., Delhi

9. Business Correspondence and Report Writing by RC Sharma and Krishna Mohan; Tata McGraw Hill Publishing Company Ltd. New Delhi

10. Communication Skills by Ms. R Datta Roy and KK Dhir, Vishal Publication, Jalandhar

2.2 APPLIED MATHEMATICS – II

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RATIONALE

Applied Mathematics forms the backbone of engineering discipline. Basic elements of differential calculus, integral calculus, differential equations and coordinate geometry have been included in the curriculum as foundation course and to provide base for continuing education to the students

DETAILED CONTENTS

1. Co-ordinate Geometry (18 hrs)

   1.1 Area of a triangle, centroid and incentre of a triangle (given the vertices of a triangle), Simple problems on locus

   1.2 Equation of straight line in various standard forms (without proof) with their transformation from one form to another, Angle between two lines and perpendicular distance formula (without proof)

   1.3 Circle: General equation and its characteristics given:
   ➢ The center and radius
   ➢ Three points on it
   ➢ The co-ordinates of the end's of the diameter

   1.4 Conics (parabola, ellipse and hyperbola), standard equation of conics (without proof), given the equation of conic to calculate foci, directrix, eccentricity, latus rectum, vertices and axis related to different conics Differential Calculus

2. Differential Calculus (22 hrs)

   2.1 Concept of function, four standard limits

   $$\underset{x \to a}{Lt}\ (x^n - a^n)/(x-a),\ \underset{x \to 0}{Lt}\ Sin\ x/x,\ \underset{x \to 0}{Lt}\ (a^x - 1)/x,\ \underset{x \to 0}{Lt}\ (1+x)^{1/x}$$

   2.2 Concepts of differentiation and its physical interpretation

   ➢ Differentiation by first principle of x^n, $(ax + b)^n$, Sin x, cos x, tan x, sec x,, cosec x and cot x, e^x, a^x, log x. Differentiation of a function of a function and explicit and implicit functions
   ➢ Differentiation of sum, product and quotient of different functions
   ➢ Logarithmic differentiation. Successive differentiation excluding n^{th} order

2.3   Application of derivatives for (a) rate measure (b) errors (c) real root by Newton's method (d) equation of tangent and normal (c) finding the maxima and minima of a function (simple engineering problems)

3.   Integral Calculus   (16 hrs)

   3.1   Integration as inverse operation of differentiation

   3.2   Simple integration by substitution, by parts and by partial fractions

   3.3   Evaluation of definite integrals (simple problems) by explaining the general properties of definite integrals

   3.4   Applications of integration for
      ➢ Simple problem on evaluation of area under a curve where limits are prescribed
      ➢ Calculation of volume of a solid formed by revolution of an area about axis (simple problems) where limits are prescribed
      ➢ To calculate average and root mean square value of a function
      ➢ Area by Trapezoidal Rule and Simpson's Rule

4.   Differential Equations   (8 hrs)

   Solution of first order and first degree differential equation by
      ➢ Variable separation
      ➢ Homogeneous differential equation and reducible homogeneous differential equations
      ➢ Linear differential equations and reducible linear differential equations

RECOMMENDED BOOKS

1.   Higher Engineering Mathematics by BS Grewal
2.   Engineering Mathematics by BS Grewal
3.   Engineering Mathematics vol. II by S Kohli and Others, IPH, Jalandhar
4.   Engineering Mathematics by Ishan Publication
5.   Applied Mathematics Vol. II by SS Sabharwal and Others; Eagle Parkashan, Jalandhar
6.   Engineering Mathematics by IB Prasad
7.   Applied Mathematics Vol. II by Dr RD Sharma
8.   Advanced Engineering Mathematics by AB Mathur and VP Jagi; Khanna Publishers, Delhi
9.   Higher Engineering Mathematics by BS Grewal; Khanna Publishers, Delhi
10.   Engineering Mathematics by C Dass Chawla; Asian Publishers, New Delhi

2.3   APPLIED PHYSICS – II

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RATIONALE

Applied physics includes the study of a large number of diverse topics related to things that go in the world around us. It aims to give an understanding of this world both by observation and prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content.

DETAILED CONTENTS

1.   Applications of sound waves   (6 hrs)

     1.1   Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time

     1.2   Ultrasonics – production (magnetostriction and peizoelectric) and their engineering applications

2.   Principle of optics   (9 hrs)

     2.1   Introduction: reflection of light, image formation in mirrors (convex and concave), refraction and refractive index, image formation in lenses, lens formulae (thin lens only), power of lens, total internal reflection

     2.2   Defects in image formation by lenses and their correction

     2.3   Simple and compound microscope, astronomical and Galileo telescope, magnifying power and its calculation (in each case)

     2.4   Overhead projector and slide projector

3.   Electrostatics   (9 hrs)

     3.1   Coulombs law, unit charge

     3.2   Gauss's Law

     3.3   Electric field intensity and electric potential

     3.4   Electric field of point charge, charged sphere (conducting and non-conducting), straight charged conductor, plane charged sheet

3.5   Capacitance, types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors

3.6   Dielectric and its effect on capacitors, dielectric constant and dielectric break down

4.   Electricity   (6 hrs)

4.1   Ohm's law

4.2   Resistance of a conductor, specific resistance, series and parallel combination of resistors, effect of temperature on resistance

4.3   Kirchoff's laws, wheatstone bridge principle and its applications

4.4   Heating effect of current and concept of electric power

5.   Semi conductor physics   (9 hrs)

5.1   Energy bands, intrinsic and extrinsic semi conductors, p-n junction diode and its characteristics

5.2   Diode as rectifier – half wave and full wave rectifier, semi conductor transistor pnp and npn (concept only)

6.   Modern Physics   (9 hrs)

6.1   Lasers: concept of energy levels, ionizations and excitation potentials; spontaneous and stimulated emission; lasers and its characteristics, population inversion, types of lasers, helium – neon and ruby lasers and applications

6.2   Fibre optics: Introduction, optical fiber materials, types, light propagation and applications

6.3   Super conductivity: Phenomenon of super conductivity, effect of magnetic field, critical field, type I and type II super conductors and their applications)

6.4   Energy sources – conventional and non-conventional (wind, water, solar, bio, nuclear energy), only elementary idea

LIST OF PRACTICALS

1.   To verify Ohm's law

2.   To verify law of resistances in series and in parallel

3.   To determine the magnifying power of a compound microscope

4.   To determine the magnifying power of an astronomical telescope

5.   To convert a galvanometer into an ammeter of a given range

6.   To convert a galvanometer into a voltmeter of a given range

7.   To find the wavelength of a He-Ne laser

8.   To find the frequency of a tuning fork by a sonometer

9.   To study characteristics of a pn junction diode

RECOMMENDED BOOKS

1.   Applied Physics Vol. II, TTTI Publication Tata McGraw Hill, Delhi

2.   Basic Applied Physics by RK Gaur; Dhanpat Rai Publications

3.   Comprehensive Practical Physics - Volume I and II by JN Jaiswal; Laxmi Publishers

4.   Numerical Problems in Physics - Volume I and II by RS Bharaj; Tata McGraw Hill

5.   Simple Course in Electricity and Magnetism by CL Arora; S Chand and Co, New Delhi

6.   Fundamental Physics - Volume I and II by Gomber and Gogia; Pardeep Publications, Jalandhar

7.   A Text Book of Optics by Subramanian and Brij Lal

8.   Physics Laboratory Manual by PK Palanisamy, Scitech Publications

9.   Fundamentals of Physics by Resnick and Halliday, Asian Books Pvt. Ltd., New Delhi

10.   Concepts in Physics by HC Verma; Bharti Bhawan Ltd., New Delhi

2.4   APPLIED CHEMISTRY-II

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RATIONALE

The role of Chemistry and chemical products in every branch of engineering is expanding greatly. Now a days various products of chemical industries are playing important role in the field of engineering with increasing number of such products each successive years. The strength of materials, the chemical composition of substances, their behaviour when subjected to different treatment and environment, and the laws of heat and dynamic energy have entered in almost every activity of modern life. Chemistry is considered as one of the core subjects for diploma students in engineering and technology for developing in them scientific temper appreciation of chemical properties of materials, which they have to handle in their professional career. Effort should be made to teach this subject through demonstration and with the active involvement of students.

DETAILED CONTENTS

1.   Metallurgy   (8 hrs)

1.1   A brief introduction of the terms: Metallurgy (types), mineral, ore, gangue or matrix, flux, slag, concentration (methods of concentrating the ores), roasting calcination and refining as applied in relation to various metallurgical operations

1.2   Metallurgy of (i) Aluminium (ii) Iron with their physical and chemical properties

1.3   Definition of an alloy, purposes of alloying, composition, properties and uses of alloys-brass, bronze, monel metal, magnalium, duralumin, alnico and invar

2.   Fuels   (10 hrs)

2.1   Definition of a 'Fuel', characteristics of a good fuel and classification of fuels with suitable examples

2.2   Definition of Calorific value of a fuel and determination of calorific value of a liquid fuel with the help of Bomb calorimeter. Simple numerical problems based upon Bomb-calorimeter method of finding the Calorific values

2.3   Brief description of 'Proximate' and 'Ultimate' analysis of a fuel. Importance of conducting the proximate and ultimate analysis of a fuel

2.4   Qualities of a good fuel and merits of gaseous fuels over those of other varieties of fuels

2.5   Manufacture, composition, properties and uses of (i) Water gas (ii) Oil gas (iii) Biogas

3   Corrosion   (3 hrs)

3.1   Meaning of the term 'corrosion' and its definition

3.2   Theories of corrosion i.e. (i) direct chemical action theory and (ii) electro chemical theory

3.3   Prevention of corrosion by
        1.   (a)   Alloying
              (b)   Providing metallic coatings
        2.   Cathodic protections:
              (a)   Sacrificial
              (b)   Impressed voltage method

4   Lubricants   (4 hrs)

4.1   Definition of (i) lubricant (ii) lubrication

4.2   Classification of lubricants

4.3   Principles of lubrication
        (i)   fluid film lubrication
        (ii)   boundary lubrication
        (iii) extreme pressure lubrication

4.4   Characteristics of a lubricant such as viscosity, viscosity index, volatility oiliness, acidity, emulsification, flash point and fire point and pour point.

5   Cement and Glass   (2 hrs)

5.1   Manufacture of Portland Cement

5.2   Manufacture of ordinary glass and lead glass

6.   Classification and Nomenclature of Organic Compounds   (5 hrs)

Classification of Organic Compounds, functional group, Homologus Series, Nomenclature, Physical and Chemical properties, and industrial use of Organic Compounds, IUPAC system of nomenclature of Carboxylic acid, Alcohols, Phenols, Aldehydes, Ketones and Amines.

LIST OF PRACTICALS

1.   Gravimetric analysis and study of apparatus used there in

2.   To determine the percentage composition of a mixture consisting of a volatile and a non-volatile substances

3.   Determine the viscosity of a given oil with the help of "Redwood viscometer"

4.   Determine the flash point of the given oil with the help of Abel's Flash Point Apparatus

5.   Estimate the amount of moisture in the given sample of coal

6.   Estimate the amount of ash in the given sample of coal

7.   Electroplate the given strip of Cu with Ni

8.   Confirmation test of alcohol, aldehydes, carboxylic acid, amine

9.   Determination of copper in the given brass solution, or sample of blue vitriol volumetrically

10.   Detection of metal iorn in the rust (solution of rust in concentrated HCL may be given).

RECOMMENDED BOOKS
1.   Chemistry in Engineering by J.C. Kuriacose and J. Rajaram; Tata McGraw-Hill Publishing Company Limited, New Delhi
2.   Engineering Chemistry by Dr. S. Rabindra and Prof. B.K. Mishra ; Kumar and Kumar Publishers (P) Ltd. Bangalore-40
3.   "A Text Book of Applied Chemistry-I" by SS Kumar; Tata McGraw Hill, Delhi
4.   "A Text Book of Applied Chemistry-I" by Sharma and Others; Technical Bureau of India, Jalandhar
5.   Engineering Chemistry by Jain PC and Jain M
6.   Chemistry of Engineering by Aggarwal CV
7.   Chemistry for Environmental Engineers by Swayer and McCarty, McGraw Hill, Delhi
8.   Progressive Applied Chemistry –I and II by Dr. G.H. Hugar; Eagle Prakashan, Jalandhar

2.5 APPLIED MECHANICS

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RATIONALE

The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, moments, friction, centre of gravity, laws of motion and simple machines which are required by the students for further understanding of other allied subjects. The subject enhances the analytical ability of the students.

DETAILED CONTENTS

1.   Introduction   (6 hrs)

    1.1   Concept of engineering mechanics, definition of mechanics, statics, dynamics, application of engineering mechanics in practical fields

    1.2   Concept of rigid body

2.   Laws of forces   (6 hrs)

    2.1   Different force systems (coplanar and non-coplanar), principle of transmissibility of forces

    2.2   Parallelogram law of forces, triangle law of forces, polygon law of forces (graphically and analytically) resolution of forces, resolving a force into two rectangular components

    2.3   Free body diagram

    2.4   Equilibrium force and its determination

    2.5   Lami's theorem

3.   Moment   (6 hrs)

    3.1   Concept of moment

    3.2   Moment of a force and units of moment

    3.3   Varignon's theorem (definition only)

    3.4   Principle of moment and its applications

3.5   Parallel forces (like and unlike) and calculating their resultant

3.6   Concept of couple, its properties and effects

3.7   General conditions of equilibrium of bodies under co-planar forces

3.8   Position of resultant force by moment

4.   Friction   (6 hrs)

4.1   Definition and concept of friction, types of friction

4.2   Laws of static friction, coefficient of friction, angle of friction, angle of repose, cone of friction

4.3   Equilibrium of a body lying on a horizontal plane, equilibrium of a body lying on a rough inclined plane, friction in simple screw jack

4.4   Calculation of least force required to maintain equilibrium of a body on a rough inclined plane subjected to a force:

     a)   acting along the inclined plane
     b)   horizontally
     c)   at some angle with the inclined plane

5.   Centre of Gravity   (6 hrs)

5.1   Concept, definition of center of gravity and centroid of plain figure and symmetrical solid body

5.2   Determination of centroid of plain and composite lamina using moment method, centroid of bodies with removed portion

5.3   Determination of center of gravity of solid bodies - cone, cylinder, hemisphere and sphere; composite bodies and bodies with portion removed

6.   Application of the laws of motion   (10 hrs)

Simple problems on second law of motion, piles, lift, bodies tied with strings

7.   Simple machines   (8 hrs)

7.1   Definition of effort, velocity ratio, mechanical advantage and efficiency of a machine and their relationship, law of machine

7.2   Simple and compound machine

7.3   Definition of ideal machine, reversible and self locking machine

7.4   Effort lost in friction, determination of maximum mechanical advantage and maximum efficiency

7.5   System of pulley (first, second, third system of pulleys), determination of velocity ratio, mechanical advantage and efficiency

7.6   Working principle and application of wheel and axle, different pulley blocks, simple screw jack, worm and worm wheel, single and double purchase winch crab, expression for their velocity ratio and field of their application

Note: Simple problem/numericals may be included in all the above topics wherever feasible

LIST OF PRACTICALS

1.   Verification of the following laws:
        a)   Parallelogram law of forces
        b)   Triangle law of forces
        c)   Polygon law of forces

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

3.   To verify the reaction at the supports of a simply supported beam

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

5.   To find the mechanical advantage, velocity ratio and efficiency of a screw jack

6.   To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel

7.   To find mechanical advantage, velocity ratio and efficiency of single purchase winch crab

8.   To find center of gravity of regular lamina

9.   To find center of gravity of irregular lamina

10.   To determine coefficient of friction between different surfaces on horizontal plane

RECOMMENDED BOOKS

1. A Text Book of Engineering Mechanics (Applied Mechanics) by RK Khurmi; S Chand and Co. Ltd., New Delhi

2. Text Book in Applied Mechanics by MM Malhotra, R Subramanian, PS Gahlot and BS Rathore; Wiley Eastern Ltd., New Delhi

3. Engineering Mechanics by SS Bhavikatti, KG Rajashekarappa; Wiley Eastern Ltd., New Delhi

4. Engineering Mechanics and Strength of Materials by S Ramamurtham; Dhanpat Rai Publishing Co.(P) Ltd.

5. Engineering Mechanics by AB Basu; Tata McGraw Hill Publishing Co. Ltd.

6. Engineering Mechanics – Volume I and II by VS Mokashi; Tata McGraw Hill Publishing Co. Ltd.

7. Elements of Strength of Materials by SP Timoshenko, DH Young; East West Press Pvt Ltd.

8. Schaum's Outline Series - Theory and Problems of Strength of Materials by William A Nash, McGraw Hill Book Company

9. A Text Book of Applied Mechanics by NL Arora and RK Dhawan; India Publishing House, Delhi

10. A Text Book of Applied Mechanics by RK Rajput; Laxmi Publications, New Delhi

11. Text Book of Applied Mechanics by Birinder Singh, Kaption Publishing House, New Delhi

2.6   ENGINEERING DRAWING – II

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RATIONALE

Drawing is said to be the language of engineers and technicians. Reading and interpreting engineering drawing is their day-to-day responsibility. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation

Note: 1.   First angle projection is to be followed
       2.   Minimum of 15 sheets to be prepared by each student
       3.   SP 46 – 1988 should be followed
       4.   Instructions relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students

DETAILED CONTENTS

1.   Detail and Assembly Drawing (2 sheets)

      1.1   Principle and utility of detail and assembly drawings

      1.2   Wooden joints i.e. corner mortice and tenon joint, Tee halving joint, Mitre faced corner joint, Tee bridle joint, Crossed wooden joint, Cogged joint, Dovetail joint, Through Mortice and Tenen joint, Corner and Through halving joint, Closed Mortise and Tenon joint

2.   Threads (3 sheets)

      2.1   Nomenclature of threads, types of threads (metric), single and multiple start threads

      2.2   Forms of various external thread sections such as V, square and acme threads, BA, BSW and Knuckle, Metric, Seller Thread, Buttress Threads

      2.3   Simplified conventions of left hand and right hand threads, both external and internal threads

3.   Locking Devices (1 sheet)

      Lock nuts, castle nuts, split pin nuts, sawn nuts, slotted nut

4.   Nuts and Bolts (3 sheets)

Different views of hexagonal and square nuts; Different views of hexagonal and square nuts; Assembly of hexagonal headed, square headed, square headed with square neck bolts with hexagonal and square nuts and washers. Foundations bolts – Rag bolt and Lewis bolt

5.   Screws, Studs and Washers (1 sheet)

    5.1   Drawing various types of machine screws

    5.2   Drawing various types of studs and set screws

6.   Keys and Cotters (3 sheets)

    6.1   Various types of keys and cotters and their practical application and preparation of drawing of various keys and cotters showing keys and cotters in position

    6.2   Cotter joints (i) sleeve and cotter joint (ii) gib and cotter joint (iii) knuckle joint (iv) Spigot and socket joint

7.   Rivets and Riveted Joints (2 sheets)

    7.1   Types of structural and general purpose rivet heads

    7.2   Caulking and fullering of riveted joints

    7.3   Types of riveted joints – lap, butt (single riveted, double riveted lap joint, single cover plate and double cover plate), chain and zig – zag riveting

8.   Welded Joints (1 sheet)

    8.1   Various conventions and symbols of welded joints (IS 696)

    8.2   Practical applications of welded joints say joints on steel frames, windows, doors and furniture

9.   Couplings (2 sheets)

    9.1   Muff or Box coupling, half lap muff coupling

    9.2   Flange coupling (Protected and non-protected)

    9.3   Flexible coupling

10. Symbols and Conventions (2 sheets)

    10.1   Civil engineering sanitary fitting symbols

    10.2   Electrical fitting symbols for domestic interior installations

    10.3   Building plan drawing with electrical and civil engineering symbols

11. Development of Surfaces (3 sheets)

    11.1   Construction of geometrical figures such as square, pentongon, hexogon

    11.2   Development of surfaces of cylinder, square, pentagonal and hexazonal, Prism, Conc and Pyramid, Sequence pentagonal and hexa pyramid

12. Interpenetration of (2 sheets)

    12.1   Cylinder to cylinder

    12.2   Cylinder to cone

13. AUTO CAD

    13.1   Concept of AutoCAD, Tool bars in AutoCAD, coordinate system, snap, grid, and ortho mode

    13.2   Drawing commands – point, line, arc, circle, ellipse

    13.3   Editing commands – scale, erase, copy, stretch, lengthen and explode

    13.4   Dimensioning and placing text in drawing area

    13.5   Sectioning and hatching

    13.6   Inquiry for different parameters of drawing entity

Note: A minimum of 15 sheets should be prepared by each student

RECOMMENDED BOOKS

1. Elementary Engineering Drawing (in first angle projection) by ND Bhatt, Charotar Publishing House
2. A Text Book of Engineering Drawing by Surjit Singh Published by Dhanpat Rai and Co. Delhi
3. Engineering Drawing by PS Gill; published by SK kataria and Sons, New Delhi