1.1   COMMUNICATION SKILLS – I

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3 - 2

RATIONALE

Interpersonal communication is a natural and necessary part of organizational life. Yet, communicating effectively can be challenging because of our inherent nature to assume, overreact to and misperceive what actually is happening. Poor communication or lack of communication is often cited as the cause of conflict and poor teamwork. In today's team-oriented workplace, managing communication and developing strategies for creating shared meaning are crucial to achieve results and create successful organizations. The goal of the Communicating Skills course is to produce civic-minded, competent communicators. To that end, students must demonstrate oral as well as written communication proficiency. These include organizational and interpersonal communication, public address and performance. The objectives of this subject are understanding how communication works, gaining active listening and responding skills, understanding the importance of body language, acquiring different strategies of reading texts and increasing confidence by providing opportunities for oral and written expressions

DETAILED CONTENTS

1.   Communication Skills   (12 Hrs)

1.1   Verbal and Non-verbal Communication
1.2   Process of Communication
1.3   Barriers to Communication; Overcoming Strategies
1.4   Listening and Speaking Skills and Sub-Skills
        (All topics should be in detail)

2.   Grammar and Usage   (12 Hrs)

2.1   Punctuation
2.2   Articles-a, an, the
2.3   Framing Questions
2.4   Verbs-Classification: Main Verb, Auxiliary Verb, Transitive and Intransitive Verbs
2.5   Word Formation

3.   Writing Skills   (10 Hrs)

3.1   Writing Paragraphs
3.2   Picture Composition

4.   Reading Skills   (14 Hrs)

Unseen comprehension passages (at least 5 passages).

LIST OF PRACTICALS

(Note: The following contents are only for practice. They should not be included in the final theory examination)

Developing Oral Communication Skills

- Greeting, Starting a Conversation
- Introducing Oneself
- Introducing Others
- Leave Taking
- Thanking, Wishing Well
- Talking about Oneself
- Talking about Likes and Dislikes

INSTRUCTIONAL STRATEGY

Looking into the present day needs of effective communication in every field, it is imperative to develop necessary competencies in students by giving practical tips and emphasis on grammar, vocabulary and its usage in addition to practical exercises. The teacher should give report writing assignments, projects etc. while teaching this subject.

LIST OF RECOMMENDED BOOKS

1.   Communicating Effectively in English, Book-I by Revathi Srinivas; Abhishek Publications, Chandigarh.
2.   High School English Grammar and Composition by Wren & Martin; S. Chand & Company Ltd., Delhi.
3.   Communication Techniques and Skills by R. K. Chadha; Dhanpat Rai Publications, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	25
2	12	25
3	10	20
4	14	30
Total	**48**	**100**

1.2 APPLIED MATHEMATICS - I

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5 - -

RATIONALE

Applied Mathematics forms the backbone of engineering students. The curriculum of mathematics has undergone changes from time to time in accordance with growth of subject. Diploma in Engineering is a launching stage where the students learn the basics of engineering. The revised syllabus has been designed keeping in view the emerging needs of all categories of students. Great emphasis has been laid on application of various contents like algebra, complex numbers, trigonometry and coordinate geometry. This course will develop analytical abilities to make exact calculations and provide continuing educational base to the students.

Note:- Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles.

DETAILED CONTENTS

1.   Algebra   (30 hrs)

    1.1   Concept of permutations and Combinations: Value of $^n p_r$, $^n c_r$.

    1.2   Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof)

    1.3   Partial fractions (linear factors, repeated linear factors, non-reducible quadratic factors excluding repeated factors)

    1.4   Determinants and Matrices – expansion of determinants (upto third order) by laplace expansion method, solution of equations (upto 3 unknowns) by Cramer's rule. Definition of matrix, addition, subtraction, multiplication of matrices (upto third order), minors and co-factors, inverse of a matrix by adjoint method (upto second order)

2.   Trigonometry   (20 hrs)

        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).

3.   Complex numbers   (10 hrs)

        Definition of complex numbers, real and imaginary parts of a complex number, polar and cartesian form and their inter-conversion, conjugate of a complex number, modulus and argument of a complex number, addition, subtraction,

multiplication and division of a complex number.

4.   Co-ordinate Geometry   (20 hrs)

4.1   Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines, perpendicular distance formula (without proof)

4.2   General equation of a circle and its characteristics. To find the equation of a circle, given:

*   Centre and radius
*   Three points lying on it
*   Coordinates of end points of a diameter

4.3   Equations of conics (ellipse, parabola and hyperbola), simple problems related to engineering (standards forms only)

INSTRUCTIONAL STATREGY

Basic elements of algebra, trigonometry, complex numbers and coordinate geometry should be taught in the light of their applications in the field of engineering and technology. By laying more emphasis on applied part, teacher can also help in providing a good continuing education base to the students.

RECOMMENDED BOOKS

1.   Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi

2.   Engineering Mathematics by Vol. I & II by S Kohli, IPH, Jalandhar

3.   Applied Mathematics by Dr. RD Sharma, Dhanpat Rai Publications, Delhi

4.   Applied Mathematics, Vol. I & II by SS Sabharwal & Sunita Jain, Eagle Parkashan, Jalandhar

5.   Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	30	40
2	20	25
3	10	10
4	20	25
Total	**80**	**100**

1.3   APPLIED PHYSICS – I

RATIONALE

Applied Physics includes the study of a large number of diverse topics all 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 will behave. Concrete uses of physical principles and analysis in various fields of engineering and technology are given prominence in the course content.

Note:- Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles.

DETAILED CONTENTS

1.   Units and Dimensions   (10 hrs)

   1.1   Physical quantities
   1.2   Fundamental and derived units
   1.3   Systems of units (CGS, MKS and SI units)
   1.4   Dimensions and dimensional formulae of physical quantities (area, volume, velocity, acceleration, momentum, force, impulse, work, power, energy, surface tension, coefficient of viscosity, stress, strain, moment of inertia, gravitational constant.)
   1.5   Principle of homogeneity
   1.6   Dimensional equations and their applications, conversion from one system of units to other for density, force, pressure, work, power, energy, velocity, acceleration
   1.7   Limitations of dimensional analysis

2.   Force and Motion   (12 hrs)

   2.1   Scalar and vector quantities – examples, representation of vector, statement of triangle law and parallelogram law
   2.2   Force, resolution and composition of forces parallelogram law of forces with derivation, friction, laws of friction, types of friction, coefficient of friction, angle of friction.
   2.3   Newton's Laws of motion – concept of momentum, determination of force equation from Newton's second law of motion; Newton's third law of motion conservation of momentum (statement only), recoil of gun, impulse and impulsive forces, simple numerical problems
   2.4   Projectile, horizontal and oblique projections (definitions)

2.5   Derivation of time of flight, maximum height and horizontal range for oblique projections

2.6   Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period

2.7   Relation between linear and angular velocity, linear acceleration and angular acceleration, relation between frequency and time period

2.8   Centripetal force and centrifugal force (definition)

2.9   Banking of roads (with derivation)

3.   Rotational Motion   (6 hrs)

3.1   Definitions of torque, moment of inertia, radius of gyration

3.2   Derivation of rotational kinetic energy and angular momentum

3.3   Conservation of angular momentum (qualitative)

4.   Gravitation and Satellites   (6 hrs)

4.1   Gravity, acceleration due to gravity

4.2   Kepler's law of planetary motion

4.3   Newton's law of gravitation

4.4   Escape velocity (no derivation)

4.5   Satellites, natural satellites, artificial satellites, geostationary satellite

5.   Work, Power and Energy   (10 hrs)

5.1   Work: definition and its SI unit, examples of zero work, positive work and negative work

5.2   Work done in moving an object on horizontal surface.

5.3   Power: definition and its SI unit

5.4   Energy: definition and its SI units, Type - kinetic energy and potential energy with examples and their derivation

5.5   Principle of conservation of mechanical energy (for freely falling bodies), transformation of energy from one form to another

6.   Properties of Matter   (8 hrs)

6.1   Elasticity, definition of stress and strain

6.2   Different types of modulus of elasticity

6.3   Pressure – its units, gauge pressure, absolute pressure, atmospheric pressure

6.4   Surface tension – its units, capillarity, rise of liquid in capillary tube (derivation), applications of surface tension, effect of temperature and impurity on surface tension

6.5   Fluid motion, stream line and turbulent flow

6.6   Viscosity, coefficient of viscosity; effect of temperature on viscosity

7.   Heat and Temperature   (12 hrs)

   7.1   Difference between heat and temperature on the basis of K.E. of molecules
   7.2   Principles of measurement of temperature and different scales of temperature
   7.3   Modes of transfer of heat (conduction, convection and radiation with examples)
   7.4   Thermal conductivity, coefficient of thermal conductivity (derivation)
   7.5   Properties of heat radiation
   7.6   Laws of Black Body Radiation: Stefan's law, Kirchoff's law, Wien's law

LIST OF PRACTICALS

1.   Familiarisation with vernier calliper, screw gauge and spherometer and determination of their vernier constants and least counts

2.   To find diameter of solid cylinder using a vernier calliper

3.   To find diameter of hollow cylinder using vernier calliper

4.   To find area of cross-section of wire/needle using screw gauge

5.   To find thickness of glass strip using spherometer

6.   To find radius of curvature of spherical surface using spherometer.

7.   To verify parallelogram law of forces.

8.   To determine atmospheric pressure at a place using Fortin's Barometer

INSTRUCTIONAL STRATEGY

Teacher can take help of various instructional materials like models, charts and graphs for imparting instructions. The field application should be made clear before teaching the forces and motion; rotational motion; gravitation and satellites; work, power and energy; properties of matter and heat and temperature etc to develop proper understanding of the physical phenomenon. Effective demonstration will make the subject interesting and develop scientific temper in the students.

RECOMMENDED BOOKS

1.   Applied Physics Vol. I, 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. Applied physics by B.L. Arora New India Publishing House, Delhi

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

11. Applied Physics vy RA Banwat and SD Dogra; Eagle Parkashan, Jallandhar

SUGGESTED DISTRIBUTION OF MARKS

S.No	Time Allotted (Hrs.)	Marks Allotted (%)
1	10	16
2	12	20
3	06	10
4	06	10
5	10	16
6	08	12
7	12	16
Total	**64**	**100**

1.4   APPLIED CHEMISTRY-I

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3 - 2

RATIONALE

Every branch of engineering is expanding greatly. The contributions of chemicals and chemical products are playing important role in the field of engineering, biotechnology, agriculture and pharmacology etc. The numbers of such chemical products are exponentially increasing each successive year. This results in enhancing the responsibility of engineers while choosing engineering materials for converting them into finished products. Now a days, choosing engineering material is not only based on conventional qualitative and quantitative testing of their chemical composition and behavior under service conditions, but also based on environmental and eco-friendly factors. To achieve such objectives it is essential to know applied aspects of chemistry. Applied chemistry for diploma students in various engineering and technology courses is designed to develop scientific temper and appreciation of physical and chemical properties of engineering materials, which are used in their professional career. Best efforts should be made to teach and train the engineers by imparting essential knowledge required from this subject through demonstrations, and minor projects.

Note:- Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles.

DETAILED CONTENTS

1.   Basic Concepts of Chemistry   (07 hrs)

   1.1   Definition of chemistry and its importance
   1.2   S.I. Units of pressure, volume, density, specific gravity, surface tension and viscosity
   1.3   Matter, element, compound and mixtures, atoms, molecules, ions, symbols and formulae (recapitulation only)
   1.4   Writing chemical formulae of simple chemical compounds and calculation of percentage composition of chemical compounds
   1.5   Chemical equations, thermo-chemical equations, balancing of chemical equations by HIT and TRIAL method

2.   Atomic Structure and Chemical Bonding   (11 hrs)

   2.1   Introduction to atom and its constituent particles, Dalton's atomic theory, Rutherford's and Bohr's model of atom (overview only)
   2.2   Atomic number, mass number, isotopes, isobars and isotones
   2.3   Concept of atomic orbitals, shapes of s and p- orbitals, quantum numbers
   2.4   Aufbau principle, Pauli's exclusion principle, Hund's rule and electronic configuration of elements (upto Z=30)
   2.5   Chemical bond, types of chemical bonding: ionic and covalent (sigma and pie bonds) with suitable examples.

3. Water   (10 hrs)

    3.1   Sources of water
    3.2   Types of water based on dissolved salts.
           3.2.1   Hard water, soft water
           3.2.2   Units to measure water hardness in ppm (mg/l) and simple numericals,
                   degree Clark & degree French
    3.3   Disadvantages of use of hard water in domestic and industrial applications
           (mainly boiler feed water)
    3.4   Methods to remove water hardness by
           3.4.1   Ion exchange process
           3.4.2   Lime-soda process
           3.4.3   Reverse Osmosis method
    3.5   Quality criteria of drinking water as per BIS. (with special emphasis on hardness,
           total dissolved solids (TDS), Chloride, alkalinity present in water)

4. Solutions   (07 hrs)

    4.1   Concept of homogenous solution, brief introduction of the terms (i) Ionization
           (ii) Acidity (iii) Basicity (iv) equivalent weight and gram equivalent weight with
           suitable examples
    4.2   Strength of a solution (i) Normality (ii) Molarity (iii) Molality as applied in
           relation to a solution.
    4.3   Definition of pH, simple numericals and different industrial applications of pH.
    4.4   Buffer solution and applications of buffer.

5. Electrolysis   (08 hrs)

    5.1   Electronic concept of oxidation and reduction
    5.2   Definition of the terms: Electrolytes, Non-electrolytes with suitable examples
    5.3   Faraday's Laws of Electrolysis and simple numericals
    5.4   Different industrial applications of 'Electrolysis'
    5.5   Applications of redox-reactions in battery technology such as (i) Dry cell (ii) lead
           acid battery and (iii) Ni-Cd battery

6. Environmental Chemistry   (05 hrs)

    6.1   Brief introduction to Environmental Chemistry and Pollution
    6.2   Causes and effects of air, water and soil pollutions
    6.3   Role of chemistry in controlling air, water and soil pollutions
    6.4   General idea of ozone depletion, global warming

LIST OF PRACTICALS

1. Volumetric analysis and study of apparatus used therein. Simple problems on volumetric analysis equation
2. Preparation of standard solution of oxalic acid or potassium dichromate
3. Determine the strength of solution of HCl with the help of a solution of NaOH and an intermediate solution of standard oxalic acid
4. Estimation of total dissolved solids (TDS) in water sample gravimetrically
5. Estimation of total alkalinity of water volumetrically
6. Determine the pH of given sample using pH meter
7. Determine the percentage purity of commercial sample like blue vitriol, 12.5 g. of which have been dissolved per litre. Given $M/20$ $Na_2S_2O_3$.
8. Determination of solubility of a solid at room temperature
9. To verify the first law of electrolysis (electrolysis of copper sulphate solution using copper electrode)

INSTRUCTIONAL STATREGY

Teacher may take help of various models and charts while imparting instructions to make the concepts clear. More emphasis may be laid on discussing and explaining practical applications of various chemical processes and reactions. In addition, students should be encouraged/motivated to study those processes in more details, which may find practical applications in their future professional life.

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. Progressive Applied Chemistry –I and II by Dr. G.H. Hugar; Eagle Prakashan, Jalandhar
5. Engineering Chemistry by Jain PC and Jain M, Dhanpat Rai Publishers, Delhi
6. Chemistry of Engineering by Aggarwal CV
7. Chemistry for Environmental Engineers by Swayer and McCarty, McGraw Hill, Delhi
8. A Text Book of Applied Chemistry-I by Sharma and Others; Technical Bureau of India, Jalandhar
9. A Text Book of Applied Chemistry-II by Dr. J K Sharma (Hindi version), Abhishek Publications, Sec. 17-C, Chandigarh.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	07	14
2	11	20
3	10	20
4	07	16
5	08	16
6	05	14
Total	**48**	**100**

1.5   BASICS OF INFORMATION TECHNOLOGY

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RATIONALE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. Almost all work places and living environment are being computerized. The subject introduces the fundamentals of computer system for using various hardware and software components. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools of MS Office/Open Office and internet form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

Note:

Explanation of Introductory part should be dovetailed with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1.   Information Technology – its concept and scope, applications of IT, ethics and future with information technology

2.   Impact of computer and IT in society.-- Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more

3.   Generations of computer, block diagram of a computer, CPU, memory, data – numeric data, alpha numeric data, processing of data.

4.   Computers for information storage, information seeking, information processing and information transmission, computer organization, computer hardware and software; primary and secondary memory: RAM, ROM, PROM etc. Input devices; keyboard, mouse, scanner, etc ; output devices ; VDU and Printer(Impact and non-Impact printers), Plotter etc. Primary and Secondary Storage (Auxiliary Storage), Secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD Memory)

5.   Introduction to Operating Systems such as MS-DOS and Windows, difference between DOS and Windows

6.   Basics of Networking – LAN, MAN,WAN

LIST OF PRACTICALS

1.   Identify and list functions of various components and peripherals of given computer.

2.   Installation of operating system viz. * Windows XP, *Windows 2007 etc.

3.   Installing a computer system by giving connection and loading the system software and application software and various sources to install software

4.   Exercises on entering text and data (Typing Practice)

5.   Features of Windows as an operating system:
   a) Start , shutdown and restore
   b) Creating and operating on the icons
   c) Opening, closing and resizing the windows
   d) Using elementary job commands like – creating, saving, modifying,   renaming, finding and deleting a file , creating and operating on a folder
   e) Introduction to all properties such as changing settings like, date, time, calculator, colour (back ground and fore ground)
   f) Using short cuts

6.   Word Processing (MS Office/Open Office)

   a) File Management:

      Opening, creating and saving a document, locating files, copying contents in some different file(s)

   b) Editing a document:

      ▪ Entering text, cut, copy, paste using toolbars
      ▪ Use of spell check
      ▪ PDF file and its conversion in different file formats (MS Word/Excel etc.)
      ▪ Scanning, editing and printing of a document

   c) Formatting a document:

      ▪ Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

      ▪ Aligning of text in a document, justification of document ,Inserting bullets and numbering

      ▪ Formatting paragraph, inserting page breaks and column breaks, line spacing

      ▪ Use of headers, footers, inserting footnote, end note, use of comments

      ▪ Inserting date, time, special symbols, importing graphic images, drawing tools

d) Tables and Borders:

- Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
- How to change docx file to doc file
- Print preview, zoom, page set up, printing options
- Using Find, Replace options

7. Spread Sheet Processing (MS Office/Open Office)

a) Starting Excel

open worksheet, enter, edit data, formulae to calculate values, format data, create chart, printing chart, save worksheet, switching between different spread sheets

b) Menu commands:

Create, format charts, organize, manage data, solving problem by analyzing data, creating graphs

c) Work books:

- Managing workbooks (create, open, close, save, rename), working in work books
- Editing a worksheet: copying, moving cells, pasting, inserting, deleting cells, rows, columns, find and replace text, numbers of cells, formatting worksheet

d) Creating a chart:

- Working with chart types, changing data in chart, formatting a chart, use chart to analyze data
- Using a list to organize data, sorting and filtering data in list

e) Formulas:

Addition, subtraction, division, multiplication, percentage and auto sum

8. Power Point Presentation (MS Office/Open Office)
a) Introduction to PowerPoint
- How to start PowerPoint
- Working environment: concept of toolbars, slide layout, templates etc.
- Opening a new/existing presentation
- Different views for viewing slides in a presentation: normal, slide sorter etc.
b) Addition, deletion and saving of slides

c)   Insertion of multimedia elements
- Adding text boxes, importing pictures, tables and charts etc.

d)   Formatting slides
- Text formatting, changing slide layout, changing slide colour scheme
- Changing background, Applying design template

e)   How to view the slide show?
- Viewing the presentation using slide navigator, Slide transition
- Animation effects etc.

9.   Antivirus

a)   What is virus and its types

b)   Problems due to virus

c)   Installation and updation of antivirus (anyone out of Kaspersky, Mcafee, Norton, Quickheal etc).

d)   How to scan and remove the virus

10.   Internet and its Applications

a)   Log-in to internet, introduction to search engine

Browsing and down loading of information from internet

b)   Creating e-Mail Account
- Log in to e-mail account and Log out from e-mail account

c)   Managing e-Mail
- Creating a message
- Sending, receiving and forwarding a message
- Attaching a file
- Deleting a message

INSTRUCTIONAL STRATEGY

Since this subject is practical oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals etc. and proficient in making use of MS Office/Open Office in addition to working on internet. The student should be made capable of working on computers independently. This subject should be taught with the help of LCD projector, (while teaching a group) using PowerPoint presentation slides.

RECOMMENDED BOOKS

1. Fundamentals of Computer by E Balagurusamy,Tata McGraw Hill Education Pvt. Ltd, New Delhi
2. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
3. Fundamentals of Computer by Sumita Arora by Dhanpat Rai and Co , New Delhi
4. Computers Today by SK Basandara, Galgotia Publication Pvt Ltd. Daryaganj, New Delhi.
5. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
6. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
8. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
9. Information Technology for Management by Henery Lucas; Tata McGraw Hill Education Pvt Ltd , New Delhi
10. MS Office by BPB Publications, New Delhi

1.6   ENGINEERING DRAWING – I

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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. The emphasis while imparting instructions should be to develop conceptual skills in the students.

Note: 1.   First angle projection is to be followed
2.   Instruction relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students

DETAILED CONTENTS

1.   Drawing Office Practice, Lines and Lettering (2 Sheets)

1.1   Definition of drawing, classification of drawing
1.2   Drawing instruments such as mini drafter, drawing board, drawing sheet, drawing pins, pencils, eraser, sandpaper, sharpener, cello-tape etc.
1.3   Sizes and layout of standard drawing sheets and drawing boards
1.4   Different types of lines in engineering drawing as per BIS specifications
1.5   Definition and classification of letterings, free hand lettering (alphabets and numerals) in different standard series of 2.5, 3,5,7,10 and 15 mm heights. Single stroke vertical and inclined lettering at 75° (alphabets and numerals) lowercase and uppercase in the ratio of 7:4.

2.   Dimensioning (2 Sheets)

2.1   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.
2.2   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.

3.   Simple Geometrical Constructions used in Engineering Practice (2 Sheets)

3.1   Construction of regular polygons   (triangle, square, pentagon, hexagon) and circles
3.2   Ellipses (concentric circle method and Intersecting Arcs method)
3.3   Parabola (rectangle and tangent method), cycloid
3.4   Freehand sketching of above geometrical shapes

4.   Scale   (2 sheets)

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

      4.2   Construction of plain and diagonal scales

5.   Principle of Projections   (10 sheets)

      5.1   Principle of orthographic projection and introduction to first angle projection and third angle projection

      5.2   Projection of points situated in different quadrants (1 Sheet)

      5.3   Projection of lines, Lines inclined to one plane and parallel to the other and vice versa (1st &3rd quadrants) (1 Sheet)

      5.4   Projection of Planes: Planes perpendicular and parallel to either of the planes; planes perpendicular to one plane and parallel to the other or vice versa (1st & 3rd quadrants) (1 Sheet)

      5.5   Drawing 3 orthographic views of given objects (6 sheets, at least one sheet in 3rd Angle Projection)

      5.6   Identification of surfaces on drawn orthographic views from isometric object drawn (1Sheet)

6.   Sectional Views (2 sheets)

      6.1   Need for sectional views –Drawing of different conventions for materials in sections, conventional breaks for shafts, pipes, rectangular, square, angle, channel and rolled sections

7.   Isometric Views   (2 sheets)

      7.1   Fundamentals of isometric projections (theoretical instructions) and isometric scales

      7.2   Isometric views of combination of regular solids like cylinder, cone, cube, prism and pyramid

8.   Development of Surfaces (2 sheets)

      8.1   Parallel line method (Prism and cylinder)

      8.2   Radial line method (Pyramid and Cone)

Note: Minimum 20 drawing sheets will be prepared by the students.

INSTRUCTIONAL STRATEGY

Teacher should show model or realia of the component/part whose drawing is to be made. Emphasis should be given on cleanliness, dimensioning and layout of sheet. Focus should be on proper selection of drawing instrument and its proper use.

RECOMMENDED BOOKS

1   Engineering Drawing by KK Dhiman, Ishan Publications, Ambala, Haryana
2.   Elementary Engineering Drawing (in first angle projection) by ND Bhatt, Charotar Publishing House, Anand, Gujrat
3.   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, Delhi
4.   Engineering Drawing by RB Gupta published by Satya Prakashan, New Delhi
5.   Engineering Drawing by NS Kumar published by King India Publication, New Delhi

1.7   GENERAL WORKSHOP PRACTICE - I

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RATIONALE

In order to have a balanced overall development of diploma engineers, it is necessary to integrate theory with practice. General workshop practices are included in the curriculum in order to provide hand on experience about use of different tools and basic manufacturing practices. This course aims at developing general manual and machining skills in the students. Besides above, the development of dignity of labour, precision, safety at work place, team working and development of right attitude are the other objectives.

DETAILED CONTENTS (PRACTICAL EXERCISES)

 Note: The students are supposed to come in proper workshop dress prescribed by the institute. Wearing shoes in the workshop(s) is compulsory. Importance of safety and cleanliness, safety measures and upkeep of tools, equipment and environment in each of the following shops should be explained and practiced. The students should prepare sketches of various tools/jobs in their practical Notebook.

The following shops are included in the syllabus:

1.   Carpentry Shop-1
2.   Fitting Shop
3.   Welding Shop-I
4.   Electric Shop –I
5.   Smithy Shop or Electronic Shop-I
6.   Sheet Metal Shop

Note:

1.   The branches e.g. Civil Engineering, Electrical Engineering, Mechanical Engineering, Production Engineering and Automobile Engineering will do **Smithy Shop** instead of Electronic Shop- I.

2.   The branches e.g. Electronics and Communication Engineering, Electronics and Instrumentation, Instrumentation and Control, Computer Engineering, Medical Electronics, Textile Technology, Textile Processing, Knitting Technology, Chemical Engineering, Ceramic Engineering and Food Technology will do **Electronic Shop-I** instead of Smithy Shop.

1.   **Carpentry Shop – I**

1.1   Introduction to various types of wood such as Deodar, Kail, Partal, Teak, Mango, Sheesham, etc. (Demonstration and their identification).

1.2 Demonstration, function and use of commonly used hand tools. Care, maintenance of tools and safety measures to be observed.

Job I Marking, sawing, planning and chiseling & their practice (size should be mentioned)

1.3 Introduction to various types of wooden joints, their relative advantages and uses.

Job II Preparation of half lap joint

Job III Preparation of Mortise and Tenon Joint

1.4 Demonstration of various methods of painting wooden items.

Job IV Preparation of wooden surface before painting including primer coating

Job V Painting Practice by brush/spray

1.5 Safety precautions in carpentry shop

2. Fitting Shop

2.1 Introduction to fitting shop tools, common materials used in fitting shop, Identification of materials. Such as Steel, Brass, Copper, Aluminium etc. Identification of various sections of steel such as Flat, Angle, Tee, Channel, Bar Girder, Square, Z-Section, etc.

2.2 Description and demonstration of various types of work benches, holding devices and files. Precautions while filing.

2.3 Description and demonstration of simple operation of hack-sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade.

Job I Marking of job, use of marking tools and measuring instruments.

Job II Filing a dimensioned rectangular or square piece of an accuracy of ± 0.5mm

Job III Filing practice (production of flat surfaces). Checking by straight edge.

Job IV Making a cutout from a square piece of MS Flat using hand hacksaw.

2.4 Care and maintenance of measuring tools like calipers, steel rule, try square, vernier calipers, micrometer, height gauge, combination set. Handling of measuring instruments, checking of zero error, finding of least count (all gauges including dial gauge).

3. Welding Shop – I

3.1 (a) Introduction to welding and its importance in engineering practice; types of welding; common materials that can be welded, introduction to welding equipment e.g. a.c. welding set, d.c. rectifier, electrode holder, electrodes and their specifications, welding screens and other welding related equipment, accessories and gloves.

(b) Safety precautions during welding

(c) Hazards of welding and its remedies

3.2   Electric arc welding, (a.c. and d.c.) precautions while using electric arc welding, Practice in setting current and voltage for striking proper arc. Earthing of welding machine.

Job I	Practice of striking arc bending and tacking while using electric arc welding set.
Job II	Welding practice on electric arc welding for making uniform and straight weld beads

3.3   Various types of joints and end preparation.

Job III	Preparation of butt joint by electric arc welding.
Job IV	Preparation of lap joint by electric arc welding.
Job V	Preparation of corner joint by using electric arc welding.
Job VI	Preparation of Tee joint by electric arc welding.

4.   Electric Shop – I

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.

Job I	Identification of phase, neutral and earth of domestic appliances and their connection to two pin/three pin plugs.
Job II	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.

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

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

Job III	Installation of inverter with battery and to connect two or more batteries in series and in parallel (knowledge of a.c. and d.c.)
Job IV	Charging of a battery and testing it with the help of hydrometer and cell tester

5.   Smithy Shop

5.1   Demonstration and detailed explanation of tools and equipment used. Forging operations in smithy shop. Safety measures to be observed in the smithy shop.

5.2   Demonstration and description of bending operation, upsetting operation, description and specification of anvils, swage blocks, hammers etc.

5.3   Demonstration and description of tongs, fullers, swages etc.

Job I	To forge a L-hook.
Job II	To prepare a job involving upsetting process
Job III	To forge a chisel
Job IV	To prepare a cube from a M.S. round by forging method.

OR

5.   Electronic Shop – I

5.1   Identification and familiarization with the following tools used in electronic shop such as Tweezers, Screw drivers (different sizes), Insulated Pliers, Cutter, Sniper, Philips Screw Driver (Star Screw Driver), L- Keys, Soldering Iron, soldering wire, flux . Their demonstration and uses.

5.2   Identification and familiarization with Multimeter (analog and digital)

Job I   Practice in the use of above mentioned tools and instruments. For this a small experimental set up may be done

5.3   Various types of protective devices such as : wire fuse, cartridge fuse etc. ,

5.4   Identification and familiarization with ear phone speaker connector, telephone jacks and similar male and female connectors (audio, video)

5.5   Safety precautions to be observed in the electronic shop

5.6   Identification and familiarization with soldering and desoldering practice

5.7   Introduction to thimbles and crimping tools

NOTE: Demonstration boards for the electronics components such as resistors, capacitors, diodes, transistors, FETs, IFT Coils, ICs should be made.

Job II   Cut, strip, join an insulated wire with the help of soldering iron (repeat with different types of wires)

Job III   Cut, strip, connect/solder/crimp different kinds of wires/ cables (including co-axial and shielded cable) to different types of power/general purpose/audio video/telephone plugs, sockets, jacks, terminals, binding posts, terminal strips, connectors. The tasks should include making complete recording/ playback/ antenna/ speaker leads for common electronic products such as Radio, TV, CD players, VCD/DVD players, cassette recorder and players, Hi-Fi equipment,   hand- set, microphone

6.   Sheet Metal Shop

Introduction to sheet metal shop, use of hand tools and accessories e.g. different types of hammers, hard and soft mallet, sheet and wire gauge, necessary allowance required during job fabrication, selection of material and specifications.

6.1   Introduction and demonstration of hand tools used in sheet metal shop.

6.2   Introduction and demonstration of various machines and equipment used in sheet metal shop e.g. shearing machine, bar folder, burring machine, power press, sheet bending machine.

6.3   Introduction and demonstration of various raw materials used in sheet metal shop e.g. M.S. sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheets etc.

6.4   Study of various types of rivets, steel screw etc.

Job I   Shearing practice on a sheet using hand shears.
            a) Practice on making single riveted lap joint/double riveted lap Joint.
            b) Practice on making single cover plate chain type, seam joint and riveted butt joint

RECOMMENDED BOOKS

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary; Media Promoters and Publishers Pvt. Ltd., Bombay

2. Workshop Technology by Manchanda Vol. I,II,III; India Publishing House, Jalandhar.

3. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd. New Delhi

4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi

5. Workshop Technology by B.S. Raghuwansh;, Dhanpat Rai and Co., New Delhi

6. Workshop Technology by HS Bawa; Tata McGraw Hill Publishers, New Delhi.