

12. STUDY AND EVALUATION SCHEME (FIRST YEAR)

FIRST SEMESTER:

| Sr. No. | SUBJECTS | STUDY SCHEME | | Credits (C) L+P = C | MARKS IN EVALUATION SCHEME | | | | | | Total Marks of Internal & External |
|-----------------------------------|--|--------------|-----------|------------------------|----------------------------|------------|------------|---------------------|------------|------------|------------------------------------|
| | | Periods/Week | | | INTERNAL ASSESSMENT | | | EXTERNAL ASSESSMENT | | | |
| | | L | P | | Th | Pr | Tot | Th | Pr | Tot | |
| 1.1 | *English and Communication Skills –I | 2 | 2 | 2+1=3 | 40 | 40 | 80 | 60 | 60 | 120 | 200 |
| 1.2 | *Applied Mathematics I | 4 | - | 4+0=4 | 40 | - | 40 | 60 | - | 60 | 100 |
| 1.3 | *Applied Physics-I | 2 | 2 | 2+1=3 | 40 | 40 | 80 | 60 | 60 | 120 | 200 |
| 1.4 | *Engineering Graphics | - | 6 | 0+3=3 | - | 40 | 40 | 60 | - | 60 | 100 |
| 1.5 | *Fundamentals of IT | 2 | 4 | 2+2=4 | 40 | 40 | 80 | 60 | 60 | 120 | 200 |
| 1.6 | *Environmental Studies & Disaster Management | 2 | - | 2+0=2 | 40 | - | 40 | 60 | - | 60 | 100 |
| 1.7 | *General Workshop Practice | - | 6 | 0+3 = 3 | - | 40 | 40 | - | 60 | 60 | 100 |
| #Student Centred Activities (SCA) | | - | 3 | - | - | - | - | - | - | - | - |
| Total | | 12 | 23 | 22 | 200 | 200 | 400 | 360 | 240 | 600 | 1000 |

* Common with other diploma programmes

Student Centred Activities will comprise of co-curricular activities like extension lectures on Constitution of India, etc, Games, Yoga, Human Values & Ethics, Knowledge of Indian System, Hobby Clubs e.g. Photography etc., Seminars, Declamation Contests, Educational Field Visits, NCC, NSS, Cultural Activities and Self-study etc.

FIRST SEMESTER

FIRST SEMESTER

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|-----|---|-------|
| 1.1 | English and Communication Skills –I | 13-15 |
| 1.2 | Applied Mathematics I | 16-19 |
| 1.3 | Applied Physics-I | 20-23 |
| 1.4 | Engineering Graphics | 24-27 |
| 1.5 | Fundamentals of IT | 28-31 |
| 1.6 | Environmental Studies & Disaster Management | 32-34 |
| 1.7 | General Workshop Practice | 35-39 |

1.1 ENGLISH & COMMUNICATION SKILLS – I

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RATIONALE

Language as the most commonly used medium of self-expression remains indispensable in all spheres of human life –personal, social and professional. This course is intended to break fresh ground in teaching of Communicative English as per the requirements of National Skill Quality Framework. This course is designed to help students to acquire the concept of communication and develop an ability or skills to use them effectively to communicate with the individuals and community.

COURSE OUTCOMES

After undergoing this subject, the students will be able to:

- CO1: Identify the nuances of Communication, both Oral and Written.
- CO2: Acquire knowledge of the meaning of communication, communication process and speaking skills.
- CO3: Acquire enhanced vocabulary and in-depth understanding of Grammatical Structures and their usage in the communication.
- CO4: Communicate effectively with an increased confidence to read, write and speak in English language fluently.

DETAILED CONTENTS

UNIT I

Reading

- 1.1 Techniques of reading: Skimming and Scanning
- 1.2 Extensive and Intensive Reading: Textual Study
- 1.3 Homecoming – R.N. Tagore
- 1.4 Life Sketch of Sir Mokshagundam Visvesvarayya
- 1.5 Life Sketch of Dr. Abdul Kalam
- 1.6 Narayan Murthy’s speech at LBSNA, Dehradun

UNIT II

Fundamentals of Communication

- 2.1 Concept and Process of Communication
- 2.2 Types of Communication (Verbal Communication)

- 2.3 Barriers to Communication
- 2.4 Speaking Skill: Significance and essentials of Spoken Communication
- 2.5 Listening Skill: Significance and essentials of Listening

UNIT III

Grammar and Usage

- 3.1 Nouns
- 3.2 Pronouns
- 3.3 Articles
- 3.4 Verbs(Main and Auxiliary)
- 3.5 Tenses

UNIT IV

Writing Skills

- 4.1 Significance, essentials and effectiveness of Written Communication
- 4.2 Notice Writing
- 4.3 Official Letters and E-mails.
- 4.4 Frequently-used Abbreviations used in Letter-Writing
- 4.5 Paragraph Writing
- 4.6 Netiquettes

PRACTICAL EXERCISES

1. Reading

Reading Practice of lessons in the Lab Activity classes.

- i. Comprehension exercises of unseen passages along with the lessons prescribed.
- ii. Vocabulary enrichment and grammar exercises based on the selected readings.
- iii. Reading aloud Newspaper headlines and important articles.

2. Fundamentals of Communication

- i. Introducing oneself, others and leave- taking(talking about yourself)
- ii. Just a minute (JAM) sessions: Speaking extempore for one minute on given topics
- iii. Situational Conversation: Offering-Responding to offers; Congratulating; Apologizing and Forgiving; Complaining; Talking about likes and dislikes, Self-introduction Mock Interviews

3. Grammar and Usage

- i. Written and Oral Drills will be undertaken in the class to facilitate holistic linguistic competency among learners.
- ii. Exercises on the prescribed grammar topics.

4. Writing Skills

- i. Students should be given Written Practice in groups so as to inculcate team-spirit and collaborative learning .
- ii. Group exercises on writing paragraphs on given topics.
- iii. Opening an e-mail account, receiving and sending emails

RECOMMENDED BOOKS

- 1) Alvinder Dhillon and Parmod Kumar Singla, “Text Book of English and Communication Skills Vol – 2”, M/S Abhishek Publications, Chandigarh.
- 2) V Sasikumar & PV Dhamija, “Spoken English”, Tata MC Graw Hills, New Delhi, Second Edition.
- 3) JK Gangal, “A Practical Course in Spoken English”, PHI Learning Pvt. Ltd., New Delhi.
- 4) NK Aggarwal and FT Wood, “English Grammar, Composition and Usage”, Macmillan Publishers India Ltd., New Delhi.
- 5) RC Sharma and Krishna Mohan, “Business Correspondence & Report writing”, Tata MC Graw Hills, New Delhi, Fourth Edition.
- 6) Kavita Tyagi & Padma Misra, “Professional Communication”, PHI Learning Pvt. Ltd., New Delhi.
- 7) Nira Konar, “Communication Skills for professionals”, PHI Learning Pvt. Ltd., New Delhi.
- 8) Krishna Mohan & Meera Banerji, “Developing Communication Skills”, Macmillan Publishers India Ltd., New Delhi, Second Edition
- 9) M. Ashraf Rizwi, “Effective Technical Communication”, Tata MC Graw Hills, New Delhi.
- 10) Andrea J Rutherford, “Basic Communication Skills for Technology”, Pearson Education, New Delhi.

INSTRUCTIONAL STRATEGY

This is practice based subject and topics taught in the class should be practiced as exercises in the Lab regularly for development of communication skills in the students. The students should be involved in activities to enhance their personality skills. This subject contains four units of equal weightage.

1.2 APPLIED MATHEMATICS - I

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RATIONALE

Contents of this course provide fundamental base for understanding engineering problems and their solution algorithms. Contents of this course will enable students to use basic tools like logarithm, binomial theorem, matrices, t-ratios and co-ordinates for solving complex engineering problems with exact solutions in a way which involve less computational task. By understanding the logarithm, they will be able to make long calculations in short time and it is also a pre-requisite for understanding Calculus.

COURSE OUTCOMES

After undergoing this subject, the students will be able to:

- CO1: Illustrate the geometric shapes used in engineering problems by Co-ordinate Geometry and Trigonometry.
- CO2: Formulate engineering problems into mathematical formats with the use matrices, co-ordinate geometry and trigonometry
- CO3: Calculate the approximate value of roots of certain expressions in engineering problems by application of binomial theorem.
- CO4: Explore the idea of location, graph, and linear relationships between two variables.
- CO5: Learn about basic fundamentals about MATLAB/ SciLab and mathematical calculation with MATLAB/ SciLab software.

DETAILED CONTENTS

UNIT I

Algebra

- 1.1 Complex Numbers: definition of complex number, real and imaginary parts of a complex number, Polar and Cartesian Form and their inter conversion, Conjugate of a complex number, modulus and amplitude, addition subtraction, multiplication and division of complex numb
- 1.2 Logarithms and its basic properties

UNIT II

Binomial Theorem, Determinants and Matrices

- 2.1 Meaning of ${}^n P_r$ & ${}^n C_r$ (mathematical expression). Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion up to 3 terms - without proof), first binomial approximation with application to engineering problems.
- 2.2 Determinants and Matrices – Evaluation of determinants (upto 2nd order), solution of equations (upto 2 unknowns) by Cramer's rule, definition of Matrices and its types, addition, subtraction and multiplication of matrices (upto 2nd order).

UNIT III

Trigonometry

- 3.1 Concept of angle, measurement of angle in degrees, grades, radians and their conversions.
- 3.2 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)
- 3.3 Applications of Trigonometric terms in engineering problems such as to find an angle of elevation, height, distance etc.

UNIT-IV

Co-ordinate Geometry

- 4.1 Cartesian and Polar co-ordinates (two dimensional), Distance between two points, mid-point, centroid of vertices of a triangle.
- 4.2 Slope of a line, equation of straight line in various standard forms (without proof); (slope intercept form, intercept form, one-point form, two-point form, symmetric form, normal form, general form), intersection of two straight lines, concurrency of lines, angle between straight lines, parallel and perpendicular lines, perpendicular distance formula, conversion of general form of equation to the various forms.

UNIT V

Geometry of Circle and Software

Circle

- 5.1 General equation of a circle and its characteristics. To find the equation of a circle, given:
 - i. Centre and radius
 - ii. Three points lying on it
 - iii. Coordinates of end points of a diameter

Software

- 5.2 **MATLAB Or SciLab software** – Theoretical Introduction, MATLAB or Scilab as Simple Calculator (Addition and subtraction of values – Trigonometric and Inverse Trigonometric functions) – General Practice

RECOMMENDED BOOKS

1. R. D. Sharma, “Applied Mathematics – I & II for Diploma Courses”, Dhanpat Rai Publications.
2. “Mathematics for Class XI”, NCERT Publication, New Delhi.
3. “Mathematics for Class XII”, NCERT Publication, New Delhi.
4. H. K Dass, “Applied Mathematics for Polytechnics”, CBS Publishers & Distributers.
5. A Ganesh and G Balasubramanian, “Textbook of Engineering Mathematics – I”, CBS Publisher, New Delhi.
6. A Ganesh and G Balasubramanian, “Textbook of Engineering Mathematics –II”, CBS Publisher, New Delhi.
7. G. B. Thomas, R. L. Finney, “Calculus and Analytic Geometry”, Addison Wesley, Ninth Edition.
8. B S Grewal, “Elementary Engineering Mathematics”, Khanna Publishers, Delhi, Thirty-fifth Edition.
9. R.K. Jain and S.R.K. Iyengar, “Advanced Engineering Mathematics”, Narosa Publishing House, New Delhi, Second Edition, 2003.
10. SS Sabharwal & Dr Sunita Jain, “Applied Mathematics Vol. I & II”, Eagle Parkashan, Jalandhar.
11. S Kohli, “Engineering Mathematics Vol. I & II”, IPH, Jalandhar.
12. Reena Garg & Chandrika Prasad, “Advanced Engineering Mathematics”, Khanna Publishing House, New Delhi
13. R. Pratap, “Getting Started with MATLAB 7”, Oxford University Press, Seventh Edition.
14. E-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

SUGGESTED WEBSITES

1. <http://swayam.gov.in>
2. <https://www.scilab.org>

INSTRUCTIONAL STRATEGY

This is theoretical subject and contains five units of equal weight age.

Basic elements of algebra, trigonometry and co-ordinate geometry can 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. Students need to be taught the skills needed to use software tools built by experts through multiple problem solving based on the topics related to Algebra, Trigonometry and Coordinate Geometry that the industry requires. Examples to be used should be related to engineering.

Useful software MATLAB or open source software SciLab can be taught theoretically by books/online literatures and basic operations can be shown practically with practical software laboratory or small mobile apps of these software or authentic Trial version of MATLAB/ SciLab software. Students should be able to relate to the actual use of these examples and the way mathematical calculations will help them in doing their job.

1.3 APPLIED PHYSICS-I

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RATIONALE

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

COURSE OUTCOMES

After completing this subject, student should be able to:

- CO1: Identify physical quantities, select their units for use in engineering solutions, and make measurements with accuracy.
- CO2: Represent physical quantities as scalar and vector and identify type of motions, various forms of energy, their conversion and applications.
- CO3: Elaborate scientific work, energy and power, forms of friction and solve problems related to them.
- CO4: Comprehend properties of matter and effect of temperature on various matter and phenomenon.
- CO5: Demonstrate the use of physical principles and analysis in various fields of technology.

DETAILED CONTENTS

UNIT I

Unit and Dimensions

- 1.1 Definition of Physics, physical quantities- fundamental and derived
- 1.2 Units: fundamental and derived
- 1.3 System of units: CGS, FPS, MKS, SI
- 1.4 Dimension, dimensional formulae and SI units of physical quantities-distance, displacement, area, volume, density, velocity, acceleration, linear momentum, force, impulse, work, power, energy, pressure, surface tension, stress, strain)
- 1.5 Dimensional equations, principle of homogeneity of dimensional equation
- 1.6 Application of dimensional analysis: checking the correctness of physical equation, conversion of system of unit (force, work, acceleration)

UNIT II**Force and Motion**

- 2.1 Scalar and vector quantities– definition and examples, representation of vector, types of vector (unit vector, position vector, co-initial vector, collinear vector, co-planar vector)
- 2.2 Vector algebra- addition of vectors, Triangle & Parallelogram law (statement and formula only),
- 2.3 Scalar and vector product (statement and formula only)
- 2.4 Force and its units, resolution of force (statement and formula only)
- 2.5 Newton’s laws of motion (statement and examples)
- 2.6 Linear momentum, Law of conservation of linear momentum (statement and examples), Impulse
- 2.7 Circular motion: definition of angular displacement, angular velocity, angular acceleration, frequency, time period; Relation between linear and angular velocity, centripetal and centrifugal forces (definition and formula only), application of centripetal force in banking of road
- 2.8 Rotational motion: definition with examples
- 2.9 Definition of torque, angular momentum, moment of inertia and its physical significance

UNIT III**Work, Power and Energy**

- 3.1 Work- definition, symbol, formula and SI unit, types of work (zero work, positive work and negative work) with example
- 3.2 Friction– definition and its simple daily life applications
- 3.3 Power- definition, formula and units
- 3.4 Energy- definition and its SI unit, examples of transformation of energy.
- 3.5 Kinetic energy- definition, examples, formula and its derivation
- 3.6 Potential energy- definition, examples, formula and its derivation
- 3.7 Law of conservation of mechanical energy for freely falling bodies (with derivation)
- 3.8 Simple numerical problems based on formula of Power and Energy

UNIT IV**Properties of Matter**

- 4.1 Elasticity and plasticity- definition, deforming force, restoring force, example of elastic and plastic body
- 4.2 Definition of stress and strain, Hooke’s law, modulus of elasticity
- 4.3 Pressure- definition, atmospheric pressure, gauge pressure, absolute pressure, Pascal’s law

- 4.4 Surface tension- definition, SI unit, applications of surface tension, effect of temperature on surface tension
- 4.5 Viscosity: definition, unit, examples, effect of temperature on viscosity

UNIT V

Heat and Temperature

- 5.1 Definition of heat and temperature (on the basis of kinetic theory)
- 5.2 Difference between heat and temperature
- 5.3 Principle and working of mercury thermometer
- 5.4 Modes of transfer of heat- conduction, convection and radiation with examples.
- 5.5 Properties of heat radiation
- 5.6 Different scales of temperature and their relationship

PRACTICAL EXERCISES

1. Familiarization of measurement instruments and their parts (for example - vernier calliper, screw gauge, spherometer, travelling microscope etc.), and taking a reading. (compulsory to all students)
2. To find diameter of solid cylinder using a vernier calliper
3. To find internal diameter and depth of a beaker using a vernier calliper and hence find its volume.
4. To find the diameter of wire using screw gauge
5. To find thickness of paper using screw gauge.
6. To determine the thickness of glass strip using a spherometer
7. To determine radius of curvature of a given spherical surface by a spherometer.
8. To verify parallelogram law of force
9. To determine the atmospheric pressure at a place using Fortin's Barometer
10. To determine force constant of spring using Hooke's law
11. Measuring room temperature with the help of thermometer and its conversion in different scale.

RECOMMENDED BOOKS

1. "Text Book of Physics for Class XI (Part-I, Part-II)", N.C.E.R.T., Delhi.
2. Dr. HH Lal, "Applied Physics, Vol. I and Vol. II", TTTI Publications, Tata McGraw Hill, Delhi.
3. AS Vasudeva, "Applied Physics – I", Modern Publishers, Jalandhar.
4. R A Banwait, "Applied Physics – I", Eagle Prakashan, Jalandhar.
5. E-books/e-tools/relevant software to be used as recommended by AICTE/ HSBTE/ NITTTR.

6. C. L. Arora, “Practical Physics”, S Chand Publication.

SUGGESTED WEBSITES

1. <http://swayam.gov.in>
2. The Physics Classroom
3. <https://www.khanacademy.org/science/physics>

INSTRUCTIONAL STRATEGY

This is hands-on practice based subject and topics taught in the class should be practiced in the Lab regularly for development of required skills in the students. This subject contains five units of equal weightage.

Teacher may use various teaching aids like models, charts, graphs and experimental kits etc. for imparting effective instructions in the subject. Students need to be exposed to use of different sets of units and conversion from one unit type to another. Software may be used to solve problems involving conversion of units. The teacher should explain about field applications before teaching the basics of mechanics, work, power and energy, rotational motion, properties of matter etc. to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students. 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. In all contents, SI units should be followed. Working in different sets of units can be taught through relevant software.

1.4 ENGINEERING GRAPHICS

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RATIONALE

Drawing is the language of engineers and technicians. Reading and interpreting engineering drawings is their day to day responsibility. The subject is aimed at developing basic graphic skills in the students 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 following BIS SP 46 – 1988.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

- CO1: Draw Orthographic views of different objects viewed from different angles.
- CO2: Draw and interpret sectional views of an object which are otherwise not visible in normal view.
- CO3: Draw Isometric views of different solids and develop their surfaces.
- CO4: Identify conventions for different engineering materials, symbols, sections of regular objects and general fittings used in Civil and Electrical household appliances /fittings.
- CO5: Draw orthographic views of different objects by using basic commands of AutoCAD.

DETAILED CONTENTS

UNIT I

1. Introduction to Engineering Drawing and Graphics

- 1.1 Introduction to use and care of drawing instruments, drawing materials, layout and sizes of drawing sheets and drawing boards.
- 1.2 Symbols and conventions-
 - a) Conventions of Engineering Materials, Sectional Breaks and Conventional lines.
 - b) Civil Engineering Sanitary fitting symbols
 - c) Electrical fitting symbols for domestic interior installations.
- 1.3 Geometrical construction-geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagons, pentagons bisecting a line and arc , division of line and circle with the help of drawing instruments.

2. Technical Lettering of Alphabet and Numerals

Definition and classification of lettering, Free hand (of height of 5,8,12 mm) and instrumental lettering (of height 20 to 35 mm) : upper case and lower case, single and double stroke, vertical and inclined (Gothic lettering) at 75 degree to horizontal and with suitable height to width ratio 7:4.

3. Dimensioning

- 3.1 Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions).
- 3.2 Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., countersunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches.

4. Scales

- 4.1 Scales –Needs and importance (theoretical instructions), Type of scales, Definition of Representative Fraction (R.F.) and Length of Scale.
- 4.2 To draw/construct plain and diagonal scales.

UNIT II

1. Orthographic Projections

- 1.1 Theory of orthographic projections (Elaborate theoretical instructions).
- 1.2 Three views of orthographic projections of different objects of given pictorial view of a block in 1st and 3rd angle.
- 1.3 Projection of Points in different quadrant
- 1.4 Projection of Straight Line (1st angle)
 - i. Line parallel to both the planes.
 - ii. Line perpendicular to any one of the reference plane and parallel to others
 - iii. Line inclined to any one of the references and parallel to another plane.
- 1.5 Projection of Plane – Different lamina like square rectangular, triangular, circle and Hexagonal pentagon. Trace of planes (HT and VT).
- 1.6 Identification of surfaces.

2. Sectioning

- 2.1 Importance and salient features
- 2.2 Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections (theoretical only).
- 2.3 Orthographic sectional views of different objects.

UNIT III

1. Introduction of projection of right solids such as prism & pyramid (square, Pentagon, Hexagonal) cube, cone & cylinder (Axes perpendicular to H.P and parallel to V.P.)
2. Introduction of sections of right solids - Section planes, Sections of Hexagonal prism, pentagon pyramid, cylinder and cone (Section plane parallel to anyone reference planes and perpendicular to V.P. and inclined to H.P.)
3. Development of Surfaces – Development of lateral surfaces of right solids like cone, cylinder, pentagonal prism, pyramid and hexagonal pyramid (Simple problems)

UNIT IV**Isometric Views**

1. Fundamentals of isometric projections and isometric scale.
2. Isometric views of different laminas like circle, pentagon and hexagon.
3. Isometric views of different regular solids like cylinder, cone, cube, cuboid, pyramid and prism.
4. Isometric views from given different orthographic projections(front, side and top view)

UNIT V**Introduction to AutoCAD**

Basic introduction and operational instructions of various commands in AutoCAD. At least two sheets of different objects on AutoCAD (given pictorial/isometric view of a block). AutoCAD skill of student is evaluated in internal assessment only not in external exam.

RECOMMENDED BOOKS

1. Surjit Singh, “A Text Book of Engineering Drawing”, Dhanpat Rai & Co., Delhi.
2. PS Gill, “Engineering Drawing”, SK Kataria & Sons, New Delhi.
3. ND Bhatt, “Elementary Engineering Drawing in First Angle Projection”, Charotar Publishing House Pvt. Ltd., Anands.
4. T. Jeyapooan, “Engineering Drawing and Graphics using AutoCAD”, Vikas Publishing House Pvt, Ltd Noida.
5. S.R.Singhal and O.P.Saxena, “A Text Book of Engineering Drawing”, Asian Publisher, Delhi.
6. RB Gupta, “Engineering Drawing”, Satya Prakashan, New Delhi.

INSTRUCTIONAL STRATEGY

Teacher should show model of 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 instruments and their proper use. First angle projection is to be

followed. Minimum of 20 sheets to be prepared and at least 2 sheets on AutoCAD. Instructions relevant to various drawings may be given along with appropriate demonstrations, before assigning drawing practice to students. This subject contains five units of equal weight age.

1.5 FUNDAMENTALS OF IT

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RATIONALE

Information technology has great influence on all aspects of life. Almost all work places and living environment are being computerized. 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 concepts of information technology and its scope, operating a computer: use of various office management tools, using internet and mobile applications etc. This course is intended to make new students comfortable with computing environment - Learning basic computer skills, learning basic application software tools, Understanding Computer Hardware, Cyber security awareness.

COURSE OUTCOMES

At the end of the subject student will be able to

- CO1: Explain the basic components of Computers, Internet and issues of abuses/ attacks on information and computers
- CO2: Handle the computer/laptop/mobiles/Internet Utilities and Install/Configure OS
- CO3: Assemble a PC and connect it to external devices
- CO4: Manage and Use Office practiced Automation Tools
- CO5: Develop worksheets and Prepare presentations

DETAILED CONTENTS

UNIT I

Basics of Computer

Brief history of development of computers, Definition of Computer, Block diagram of a Computer, Hardware, Software, Booting: Cold and Hot Booting, Interaction between the CPU and Memory with Input/Output devices, Function of CPU and major functional parts of CPU.

Memory, Bit, Nibble, Byte, KB, MB, GB, TB, PB, Functions of memory, Use of storage devices in a Computer, List types of memory used in a Computer, Importance of cache memory, CPU speed and CPU word length

UNIT II

Basic Internet Skills

Understanding browser, Introduction to WWW, efficient use of search engines, awareness about Digital India portals (state and national portals) and college portals. Advantages of Email, Various email service providers, Creation of email id, sending and receiving emails, attaching documents with email and drive.

Effective use of Gmail, G-Drive, Google Calendar, Google Sites, Google Sheets, Online mode of communication using Google Meet & WebEx.

UNIT III

Basic Logic building

Introduction to Programming, Steps involved in problem solving, Definition of Algorithm, Definition of Flowchart, Steps involved in algorithm development, differentiate algorithm and flowchart, symbols used in flowcharts, algorithms for simple problems, flowcharts for simple problems, Practice logic building using flowchart/algorithms

UNIT IV

Office Tools

Office Tools like LibreOffice/OpenOffice/MSOffice.

OpenOffice Writer – Typesetting Text and Basic Formatting, Inserting Images, Hyperlinks, Bookmarks, Tables and Table Properties in Writer

Introducing LibreOffice/OpenOffice *Calc*, Working with Cells, Sheets, data, tables, using formulae and functions, using charts and graphics.

OpenOffice Impress – Creating and Viewing Presentations, Inserting Pictures and Tables, Slide Master and Slide Design, Custom Animation.

UNIT V

Use of Social Media

Introduction to Digital Marketing – Why Digital Marketing, Characteristics of Digital Marketing, Tools for Digital Marketing, , Effective use of Social Media like LinkedIn, Google+, Facebook, Twitter, etc.: Features of Social media, Advantages and Disadvantages of Social Media.

PRACTICAL EXERCISES

1. Browser features, browsing, using various search engines, writing search queries
2. Visit various e-governance/Digital India portals, understand their features, services offered
3. Read Wikipedia pages on computer hardware components, look at those components in lab, identify them, recognize various ports/interfaces and related cables, etc.
4. Using Administrative Tools/Control Panel Settings of Operating Systems

5. Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6. Explore features of Open Office tools and MS-Office, create documents, create presentation, create spread sheet, using these features, do it multiple times
7. Working with Conversion Software like pdfToWord, WordToPPT, etc.
8. Working with Mobile Applications – Searching for Authentic Mobile app, Installation and Settings, Govt. of India Mobile Applications
9. Creating email id, sending and receiving mails with attachments.
10. Using Google drive, Google calendar
11. Create Flow chart and Algorithm for the following
 - i. Addition of n numbers and display result
 - ii. To convert temperature from Celsius to Fahrenheit
 - iii. To find Area and Perimeter of Square
 - iv. Swap Two Numbers
 - v. find the smallest of two numbers
 - vi. Find whether given number is Even or Odd
 - vii. To print first n even Numbers
 - viii. find sum of series $1+2+3+\dots+N$
 - ix. print multiplication Table of a number
 - x. generate first n Fibonacci terms $0,1,1,2,3,5\dots n$ ($n>2$)
 - xi. sum and average of given series of numbers
 - xii. Factorial of number n ($n!=1\times 2\times 3\times\dots n$)
 - xiii. Armstrong Number
 - xiv. Find whether given number is Prime or not

RECOMMENDED BOOKS

1. R.S. Salaria, “Computer Fundamentals”, Khanna Publishing House.
2. Ramesh Bangia, “PC Software Made Easy – The PC Course Kit”, Khanna Publishing House.
3. Online Resources, Linux man pages, Wikipedia
4. Mokhtar Ebrahim and Andrew Mallett, “Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming”.
5. Vikas Gupta, “Comdex Hardware and Networking Course Kit”, Dream Tech press, New Delhi, 2008.
6. Sumitabha Das, “UNIX concepts and applications” Tata McGraw Hill, New Delhi, 2008, Fourth Edition.

SUGGESTED WEBSITES

1. <https://nptel.ac.in/courses/106/106/106106222/> - NPTEL Course on Modern Application Development
2. https://onlinecourses.swayam2.ac.in/aic19_de01/preview -
3. <https://spoken-tutorial.org/> - Tutorials on Introduction to Computers, HTML, LibreOffice Tools, etc.
4. NOTEPAD++
5. <https://tms-outsource.com/blog/posts/web-development-ide/>

INSTRUCTIONAL STRATEGY

This is a skill based subject and topics taught in the class should be practiced in the Lab regularly for development of required skills in the students. This subject contains five units of equal weight age.

1.6 ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

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RATIONALE

A diploma holder must have knowledge of different types of pollution caused due to industrial and construction activities so that he/she may help in balancing the ecosystem and controlling pollution by various control measures. The course is intended to provide a general concept in the dimensions of environmental pollution and disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response and recovery.

COURSE OUTCOMES

After undergoing the subject, the student will be able to:

- CO1: Comprehend the importance of sustainable ecosystem.
- CO2: Clarify interdisciplinary nature of environmental issues.
- CO3: Describe corrective measures for the abatement of pollution.
- CO4: Identify the role of non-conventional energy resources in environmental protection.
- CO5: Recognize various types of disasters.

DETAILED CONTENTS

UNIT I

Introduction

- 1.1 Basics of ecology, eco system- concept, and sustainable development, Sources, advantages, disadvantages of renewable and nonrenewable energy.
- 1.2 Rain water harvesting
- 1.3 Deforestation – its effects & control measures

UNIT II

Air and Noise Pollution

- 2.1 Air Pollution: Source of air pollution. Effect of air pollution on human health, economy, Air pollution control methods.
- 2.2 Noise Pollution: Source of noise pollution, Unit of noise, Effect of noise pollution, Acceptable noise level, Different method of minimizing noise pollution.

UNIT III**Water and Soil Pollution**

- 3.1 Water Pollution: Impurities in water, Cause of water pollution, Source of water pollution. Effect of water pollution on human health, Concept of DO, BOD, COD. Prevention of water pollution- Water treatment processes, Sewage treatment. Water quality standard.
- 3.2 Soil Pollution :Sources of soil pollution, Effects and Control of soil pollution, Types of Solid waste- House hold, Industrial, Agricultural, Biomedical, Disposal of solid waste, Solid waste management E-waste, E – waste management

UNIT IV**Impact of Energy Usage on Environment**

Global Warming, Green House Effect, Depletion of Ozone Layer, Acid Rain. Eco-friendly Material, Recycling of Material, Concept of Green Buildings, Concept of Carbon Credit & Carbon footprint.

UNIT V**Disaster Management****A. Different Types of Disaster:**

Natural Disaster: such as Flood, Cyclone, Earthquakes and Landslides etc.

Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea Rail & Road), Structural failures(Building and Bridge), War & Terrorism etc.

B. Disaster Preparedness:

Disaster Preparedness Plan

Prediction, Early Warnings and Safety Measures of Disaster

Psychological response and Management (Trauma, Stress, Rumour and Panic)

RECOMMENDED BOOKS

1. S.C. Sharma & M.P. Poonia, “Environmental Studies”, Khanna Publishing House, New Delhi.
2. BR Sharma, “Environmental and Pollution Awareness”, Satya Prakashan, New Delhi.
3. Dr. RK Khitoliya, “Environmental Pollution”, S Chand Publishing, New Delhi.
4. Erach Bharucha, “Environmental Studies”, University Press (India) Private Ltd., Hyderabad.
5. Suresh K Dhamija, “Environmental Engineering and Management”, S K Kataria and Sons, New Delhi.
6. E-books/e-tools/relevant software to be used as recommended by AICTE/BTE/NITTTR, Chandigarh.
7. Dr. Mrinalini Pandey, “Disaster Management”, Wiley India Pvt. Ltd.

8. Tushar Bhattacharya, “Disaster Science and Management”, McGraw Hill Education (India) Pvt. Ltd.

INSTRUCTIONAL STRATEGY

In addition to theoretical instructions, different activities pertaining to Environmental Studies and Disaster Management like expert lectures, seminars, visits etc. may also be organized This subject contains five units of equal weightage.

1.7 GENERAL WORKSHOP PRACTICE

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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 Practice is included in the curriculum in order to provide hands-on experience about use of different tools and basic manufacturing practices. This subject aims at developing general manual and machining skills in the students. In addition, the development of dignity of labour, safety at work place, team working and development of right attitude are the other objectives.

COURSE OUTCOMES

After undergoing this subject, the students will be able to:

CO1: Identify tools, equipment and materials used in preparing jobs.

CO2: Take measurements with the help of basic measuring tools/equipment.

CO3: Select materials, tools, and sequence of operations to make a job as per given specifications/drawing.

CO4: Prepare simple jobs independently and inspect the same.

CO5: Use safety equipment and Personal Protection Equipment (PPE).

CO6: Maintain good housekeeping practices.

DETAILED CONTENTS CUM 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. Welding Shop I
2. Fitting and Plumbing Shop I
3. Sheet Metal Shop
4. Carpentry Shop I
5. Painting Shop
6. Electric and Electronics Shop I

1. WELDING SHOP – I

- 1.1 Safety Precautions of concerned shop and use of personal protective equipment (PPE), demonstration of tools, equipment, sample jobs, Best practices in the concerned shop.
- 1.2 Introduction and importance of welding process as compared to other material joining processes. Specifications and type of ARC welding machines, parts identification, classification, selection and coding of electrodes, welding parameters, welding joints and welding positions. Common weldable materials, safety precautions in welding shop, use of Personal Protective Equipment, Use of welding screens, Hazards and remedies during welding, Elementary symbolic representations, demo of tools, equipment, sample jobs prepared, set up of Gas welding apparatus, and welding defects.
- 1.3 Jobs to be prepared
 - Job I Practice of striking arc and depositing uniform and straight beads on flat at different current levels. (Minimum 4 beads on M.S. flat at four setting of current level using shielded metal arc welding and differentiating their characteristics).
 - Job II Edge Preparation and welding lap joint using shielded metal arc welding (SMAW) process.
 - Job III Edge Preparation and welding butt joint using shielded metal arc welding process.
 - Job IV Edge Preparation and welding T Joint using shielded metal arc welding (100mm x 6 mm M.S. Flat).
 - Job V To make a simple job using oxy acetylene gas welding.

2. FITTING AND PLUMBING SHOP – I

- 2.1 Safety Precautions of concerned shop and use of personal protective equipment (PPE), demonstration of tools, equipment, sample jobs, Best practices in the concerned shop.
- 2.2 Introduction and Function of holding/ clamping devices, hand tools and cutting tools,
- 2.3 Practical applications of fitting and plumbing
- 2.4 Introduction, function and types of marking and measuring tools and instruments (surface plate, try square, caliper, steel rule, scribe and Vernier caliper)
- 2.5 Identification of materials. (Iron, Copper, Stainless Steel, Aluminum etc.) and identification of various steel sections (flat, angle, channel, bar etc.).
- 2.6 Introduction to various types of pipes (eg water, steam, gas etc) and functions of various pipe fitting items (GI pipe fittings, CPVC pipe fittings), Methods of pipe joints
- 2.7 Introduction to various types of threads (internal and external)
- 2.8 Description and demonstration of various types of drills, taps and dies.
- 2.9 Jobs to be prepared:
 - Job I To fit hacksaw blade in its frame and perform hacksawing operation by using marking media and marking tool and straight sawing practice.
 - Job II To perform filing on MS workpiece (75 * 50 * 6 mm) for giving it a perfect rectangular shape and drilling, tapping operation.

- Job III To perform step filing operation at right angle on MS workpiece.
- Job IV Making external threads on a pipe by using die and to make a PVC/GI pipe connection using nipple and socket.
- Job V Fitting of all components of wash basin and ball valve in a tank.

3. SHEET METAL SHOP

- 3.1. Safety Precautions of concerned shop and use of personal protective equipment (PPE), demonstration of tools, equipment, sample jobs, best practices in the concerned shop.
- 3.2 Demonstration of various power tools, apparatus, equipment, hand tools used in sheet metal shop.
- 3.3 Jobs to be prepared
- Job I Prepare a seam joint by using hand tools on GI sheet.
- Job II To prepare riveted lap joint (single/double) on GI sheet.
- Job III To fabricate a funnel of GI sheet using operations of shearing, flattening and bending.
- Job IV To fabricate a conduit joint using various sheet metal operations.
- Job V To fabricate a utility job (eg soap case/file tray/canister box) of thin GI sheet.

4. CARPENTRY SHOP - I

- 4.1 Safety Precautions of concerned shop and use of personal protective equipment (PPE), demonstration of tools, equipment, sample jobs, Best practices in the concerned shop.
- 4.2 Introduction and industrial applications of carpentry jobs.
- 4.2.1 Name and use of raw materials used in carpentry shop : wood & alternative materials(board, plywood)
- 4.2.2 Introduction to wood, timber and their identification, shapes and specifications, their properties, applications & defects. Study of the joints in roofs, doors, windows and furniture, seasoning of wood
- 4.2.3 Names, uses, and types of hand tools such as Saws, C-Clamp, Chisels, Mallets, Carpenter's vices, Marking gauges, Try-squares, Rulers and other commonly used tools and materials used in carpentry shop by segregating as cutting tools, supporting tools, holding tools, measuring tools etc.
- 4.2.4 Specification of iron jack plane used in carpentry shop.
- 4.3 Practice
- 4.3.1 Practices for Basic Carpentry Work
- 4.3.2 Sawing practice using different types of saws
- 4.3.3 Assembling jack plane — planning practice including sharpening and blade adjustment of jack plane cutter
- 4.3.4 Chiselling practice using different types of chisels including sharpening of chisel
- 4.3.5 Making of different types of wooden pin and fixing methods. Marking measuring and inspection of jobs.

4.3.6 Housekeeping practices and instructions.

4.4 Jobs to be Prepared

Job I Prepare a rectangular wooden block involving operations like Marking, sawing, planning to size, chiseling.

Job II Prepare a Half Lap Joint (cross, L or T – any one).

Job III Prepare a Mortise and Tenon joint (T-Joint).

Job IV Prepare a Dove tail Joint (Half lap dovetail joint).

Job V Prepare a Bridle Joint.

5. PAINTING SHOP

5.1 Safety Precautions of concerned shop and use of personal protective equipment (PPE), demonstration of tools, equipment, sample jobs, Best practices in the concerned shop.

5.2 Introduction to paints, varnishes, primers and their types, General properties of paints, Constituents of paints, polishes, their advantages and applications.

5.3 Introduction of powder coating and spray painting with their uses. Different types of tools and equipment used in polishing and painting.

5.4 Preparation of different colours of the paints by using prime colours, Practical demonstration of powder coating and spray painting on a utility object

5.5 Jobs to be Prepared

Job I Prepare wooden surface for painting such as cleaning, sanding, applying putty, filling procedure and application of primer coat and brush paint the same.

Job II Painting on wooden and metallic surfaces by spray gun.

Job III Practice of lettering: name plates / sign board.

Job IV Practice of dip painting/powder coating.

Job V Prepare wooden surface for polishing, apply French polish on wooden surface.

6. ELECTRICAL AND ELECTRONICS SHOP - I

6.1 Safety Precautions of concerned shop and use of personal protective equipment (PPE), demonstration of tools, equipment, sample jobs, best practices in the concerned shop.

6.2 Demonstration and identification of common electrical materials with standard ratings and specifications such as wires, cables, switches, MCB & ELCB, fuses, cleats, clamps and allied items, tools and accessories.

6.3 Identification of phase, Neutral and Earth wires for connection to domestic electrical appliances and their connections to three pin plugs. Difference between series and parallel wiring.

6.4 Jobs to be performed

Job I Carrying out house wiring circuits using fuse, switches, sockets, ceiling rose etc. in batten or P.V.C. casing-caping. Demo of conduit wiring through junctions.

Job II To prepare a three level Godown wiring circuit with PVC conduit wiring system.

Job III Installation of Solar Panel, inverter and batteries.

6.5 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 and their demonstration and uses. Identification and familiarization with multimeter (analog and digital). Various types of protective devices such as wire fuse, cartridge fuse etc. Identification and familiarization with ear phone speaker connector, telephone jacks and similar male and female connectors (audio, video).

6.6 Jobs to be performed

Job IV Practice in the use of tools and instruments used in electronics shop. For this a small experimental set up may be done.

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

RECOMMENDED BOOKS

1. SK Hajra Choudhary and AK Choudhary, “Workshop Technology I, II, III”, Media Promoters and Publishers Pvt. Ltd., Mumbai, Fifteenth Edition, 2016.
2. RK Jain, “Workshop Technology Vol I& II”, Khanna Publishers, New Delhi, First Edition, 2021.
3. Manchanda, “Workshop Technology Vol. I, II, III”, India Publishing House, Jalandhar.
4. S.S. Ubhi, “Workshop Training Manual Vol. I, II”, Katson Publishers, Ludhiana.
5. K Venkata Reddy, “Manual on Workshop Practice”, MacMillan India Ltd., New Delhi, Sixth Edition, 2020.
6. “General Workshop Manual (Diploma Jobs)”, Khanna Publishers, First Edition, 2021.
7. T Jeyapoovan, “Basic Workshop Practice Manual”, Vikas Publishing House (P) Ltd., New Delhi.
8. B. S. Raghuvanshi, “Workshop Technology, Vol. I”, Dhanpat Rai and Sons, Delhi, Eleventh Edition, 2017.
9. Kanniah K L, Narayana, “Workshop Manual”, Scitech Publications, Chennai, Second Edition 1998.
10. H S Bawa, “Workshop Practice”, Tata McGraw Hill Publication, First Edition, 2004

INSTRUCTIONAL STRATEGY

This is hands-on practice based workshop for development of required skills in the students.