

1.1 ENGLISH AND COMMUNICATIONS SKILLS-I

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3	2

RATIONALE

Communication skills play an important role in career development. This subject aims at introducing basic concepts of communication besides laying emphasis on developing listening, speaking, reading and writing skills.

LEARNING OUTCOMES

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

- Pronounce properly.
- Overcome communication barriers.
- Write legibly and effectively.
- Listen in proper perspective.
- Read various genres adopting different reading techniques.
- Converse logically.

DETAILED CONTENTS

1. Basics of Communication (12hrs)

Definition and process of communication

Introduction to types of communication-formal and informal, oral and written, verbal and non-verbal

Objectives of communication

Essentials of communication

Introduction to channels of communication - formal (upward, downward, diagonal, horizontal), informal (grapevine, consensus)

Barriers to communication

2. Functional Grammar and Vocabulary (12hrs)

Parts of speech

Article

Tenses

Subject verb agreement sentences

Active and passive voice

Synonyms and antonyms

Pair of words

Correction of incorrect sentences

3. Listening (04hrs)

Meaning of listening
 Listening and hearing
 Importance of listening
 Active listening–Meaning and strategies
 Methods to improve listening skills

4. Speaking (03hrs)

Importance
 Methods to improve speaking

5. Reading (12hrs)

Meaning
 Techniques of reading: skimming, scanning, intensive and extensive reading
 Comprehension, vocabulary enrichment and grammar exercises based on following readings:

Section- I

- My Struggle for an Education–Booker T. Washington
- Abraham Lincoln’s letter to his son’s headmaster –Abraham Lincoln
- Gateman’s Gift – R.K Narayan
- The Selfish Giant-Oscar Wilde

Section- II

- Say Not, the Struggle Nought Availeth – A HClough
- Stopping by Woods on a Snowy Evening– Robert Frost
- Where the Mind is Without Fear– Rabindranath Tagore

6. Writing (02hrs)

Significance and effectiveness of writing
 Paragraph writing –Word choice, sentence formation and construction of paragraph.

LIST OF PRACTICALS

1. Self and peer introduction
2. Newspaper reading
3. Just a Minute session–extempore
4. Situational conversation and role play
5. Language learning using open source software.

6. Greetings for different occasions
7. Improving pronunciation through tongue twisters.

INSTRUCTIONAL STRATEGY

Open source software should be used to help the students in developing listening skills. Student centred activities such as group discussions, role play should be used to ensure active participation of students in the classroom.

RECOMMENDED BOOKS

1. Revathi, Srinivas, "Communicating Effectively in English, Book-I", Abhishek Publications, Chandigarh.
2. Mohan, Krishna & Meera Banerji, "Developing Communication Skills (2nd Edition)", Published by Macmillan Publishers India Ltd; New Delhi.
3. Eastwood, John, "Oxford Practice Grammar", Oxford University Press, London
4. Chadha, R. K., "Communication Techniques and Skills", Dhanpat Rai Publications, New Delhi.
5. Wren & Martin, "High School English Grammar and Composition", S. Chand & Company Ltd., Delhi.
6. Kumar, Sanjay & Pushp Lata, "Communication Skills", Oxford University Press, New Delhi

WEBSITES FOR REFERENCE

1. <http://www.mindtools.com/page8.html>
2. <http://www.letstalk.com.in>
3. <http://www.englishlearning.com>
4. <http://learnenglish.britishcouncil.org/en/>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	12	12
2	12	12
3	04	6
4	03	3
5	12	15
6	02	2
Total	45	50

APPLIED MATHEMATICS -I**L P**
4 -**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 binomial theorem, partial fractions, etc. for solving complex engineering problems with exact solutions in a way which involve less computational task. The analytical capabilities will enable the students to solve problems in engineering field.

LEARNING OUTCOMES

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

- Apply Complex Number and its representation for two dimensional designing and related calculations.
- Apply the basic concepts of permutation and combination to find out various ways or arrangements possible for a particular problem.
- Apply binomial theorem to find approximate value of certain expressions and extracting roots of certain expressions.
- Apply basics concepts of partial fractions to simplify the concept of rational expression.
- Solve engineering problems that are in matrix format by applying the basic understanding of matrices and their properties,
- Solve problems related to height, distance, elevation by making use of trigonometry.
- Write the equation of straight line and circle by using coordinate geometry.
- Optimize the utilization of resources by applying concepts of linear programming.

DETAILED CONTENTS

1. Algebra (20hrs)

Complex Numbers: Complex number, representation, modulus and amplitude.

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

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 without proof), first and second binomial approximation with applications to engineering problems.

Introduction to Matrices and Determinants – Addition, subtraction and multiplication (up to 3×3 matrices), Determinants, simple properties, Cramer Rule.

2. Trigonometry (15hrs)

Introduction to T ratios, 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 ($2A$, $3A$, $A/2$).

Applications of Trigonometric terms in engineering problems such as to find an angle of elevation, height, distance etc.

3. Co-ordinate Geometry (18hrs)

Cartesian and Polar coordinates (two dimensional), conversion from Cartesian to Polar coordinates and vice-versa

Slope of a line, equation of straight line in various standards forms (without proof); (slope intercept form, intercept form, one-point form, two-point form, symmetric form, normal form, general form), inter section of two straight lines, concurrency of lines, angle between straight lines.

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 endpoints of a diameter

4. Operations Research (7hrs)

Linear Programming Problems formulations.

Graphical Method

INSTRUCTIONAL STRATEGY

Basic of algebra, trigonometry, coordinate geometry, operations research 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.

RECOMMENDED BOOKS

1. Grewal, BS, "Elementary Engineering Mathematics", Khanna Publishers, New Delhi
2. Sabharwal, SS & Dr Sunita Jain, "Applied Mathematics, Vol. I & II", Eagle Parkashan, Jalandhar
3. Sastry, SS, "Engineering Mathematics, Vol I & II", Prentice Hall of India Pvt. Ltd.,
4. Pal, Srimanta and Subodh C. Bhunia, "Engineering Mathematics", Oxford University Press, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1.	20	16
2.	15	12
3.	18	16
4	7	06
Total	60	50

APPLIED PHYSICS-I

L	P
3	2

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 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. In all contents, SI units should be followed.

LEARNING OUTCOMES

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

- Select units of various physical quantities for use in engineering solutions.
- Represent physical quantities as scalar and vector.
- Use the concepts of force and motion to solve problems.
- Solve problems related to friction, work, power and energy.
- Comprehend properties of matter.
- Comprehend modes of heat transfer.
- Make measurements with accuracy.

DETAILED CONTENTS

1. Units and Dimensions (9hrs)

Physical quantities Units - fundamental and derived units, systems of units (FPS, CGS and SI units)

Dimensions and dimensional formulae of physical quantities (area, volume, velocity, acceleration, momentum, force, impulse, work, power, energy, surface tension, stress, strain)

Principle of homogeneity of dimensions

Dimensional equations and their applications, conversion of units from one system to another for density, force, pressure, work, power, velocity and acceleration. Checking of dimensional equations

Limitations of dimensional analysis

2. Force and Motion (10hrs)

Scalar and vector quantities –examples, representation of vector, types of vectors
 Addition and Subtraction of Vectors, Triangle and Parallelogram Law (Statement only), Scalar and Vector Product.
 Resolution of Vectors
 Force, Momentum, Statement of Conservation of Linear Momentum, its applications
 Impulse and its Applications
 Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period.
 Relation between linear and angular velocity, linear acceleration and angular acceleration (Only Formula), Angular momentum and torque (definition only)
 Concept of centripetal and centrifugal forces and their applications with examples such as banking of roads

3. Work, Power and Energy (8hrs)

Work: and its units, examples of zero work, positive work and negative work
 Friction: concept, types, laws of limiting friction
 Energy and its units: Kinetic energy and gravitational potential energy with examples and their derivation
 Principle of conservation of mechanical energy for freely falling bodies, examples of transformation of energy.
 Power and its units, calculation of power in numerical problems

4. Properties of Matter (9hrs)

Elasticity: definition of stress and strain, Moduli of elasticity (Only definition, No derivation), Hooke's law, significance of stress strain curve
 Pressure: definition, its units, atmospheric pressure, gauge pressure, absolute pressure
 Surface tension: concept, its units, angle of contact, applications of surface tension, effect of temperature on surface tension
 Viscosity and coefficient of viscosity: Terminal velocity, Stoke's law

5. Thermometry (9hrs)

Difference between heat and temperature
 Modes of transfer of heat (Conduction, convection and radiation with examples)
 Different scales of temperature and their relationship
 Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them
 Concept of Co-efficient of thermal conductivity

LIST OF PRACTICALS (to perform minimum 8 experiments)

1. To find volume of solid sphere using a vernier caliper.
2. To find internal diameter and depth of a beaker using a vernier caliper and hence find its volume.
3. To find the diameter of wire using a screw gauge
4. To determine the thickness of glass strip using a spherometer
5. To verify parallelogram law of forces
6. To study conservation of energy of a ball or cylinder rolling down an inclined plane.
7. To determine the atmospheric pressure at a place using Fortin's Barometer
8. To determine the viscosity of glycerin by Stoke's method
9. To determine the coefficient of linear expansion of a metal rod
10. To determine force constant of spring using Hooke's law

INSTRUCTIONAL STRATEGY

Teacher may use various teaching aids like models, charts, graphs and experimental kits etc. for imparting effective instructions in the subject. The teacher should explain about field applications before teaching the basics. To develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students.

RECOMMENDED BOOKS

1. “Text Book of Physics for Class XI (Part-I, Part-II)”, N.C.E.R.T., Delhi
2. “Applied Physics, Vol. I and Vol. II”, TTTI Publications, Tata McGraw Hill, Delhi
3. Verma, HC, “Concepts in Physics Vol. I & II”, Bharti Bhawan Ltd. New Delhi
4. “Comprehensive Practical Physics, Vol, I & II”, JN Jaiswal, Laxmi Publications(P) Ltd., New Delhi
5. Naik, PV, “Engineering Physics”, Pearson Education Pvt. Ltd, New Delhi
6. Banwait, RA & R, Dogra, “Applied Physics I & II”, Eagle Parkashan, Jalandhar
7. Bhattacharya, DK & Poonam Tandan, “Engineering Physics”, Oxford University Press, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1.	9	10
2.	10	12
3.	8	8
4.	9	10
5.	9	10
Total	45	50

ENVIRONMENTAL STUDIES

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2	-

RATIONALE

Engineering activities require the use of natural resources which results in wide-ranging adverse effects on the environment. Natural replenishment of these resources is practically impossible. This necessitates that all technicians should know about the basics of ecology, environment and its functions, environmental pollution and management and environmental legislation which will enable them to accomplish their professional work with environmental compatibility. Hence this subject.

LEARNING OUTCOMES

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

- Comprehend the importance of ecosystem and environment. •
Demonstrate interdisciplinary nature of environmental issues.
- Identify different types of environmental pollution and control measures. •
Take corrective measures for the abatement of environmental pollutions. •
Compute the impact of human activities on the environment.
- Understand purpose of environmental legislation acts.
- Define energy management, energy conservation and energy efficiency
- Demonstrate positive attitude towards judicious use of energy and environmental protection
- Practice energy efficient techniques in day-to-day life and industrial processes. •
Adopt cleaner productive technologies
- Identify the role of non-conventional energy resources in environmental protection.

DETAILED CONTENTS

1. Introduction: (4hrs)
Basics of ecology, eco system and environment. Review of carbon, nitrogen, sulphur and water cycle)
2. Conservation of land reforms: (3 hrs)
Desertification, Causes, effects and prevention. rainwater harvesting, maintenance of ground water, deforestation –its effects and control measures
3. Environmental Pollution: (10hrs)
Sources of pollution - natural and man made, causes, effects and control measures of pollution (air, water, noise, soil and radioactive). Concept of BOD, COD and AQI, Prevention of Pollution- Introduction to Cleaner Production Technologies, Waste Minimization Techniques, Concept of Zero Discharge, Impact of Energy

Usage on Environment: Global Warming, Green House Effect, Depletion of Ozone Layer, Acid Rain.

4. Solid Waste management (3hrs)
Classification of refuse material, sources, effects and control measures. Introduction to E-waste Management
5. Environmental Legislation (4hrs)
Introduction to Water (prevention and control of pollution) Act, Air (Prevention and Control of Pollution) Act and Environmental Protection Act, Role and Function of State Pollution Control Board, Introduction to Energy Conservation Act & its importance, Concept of Environmental Impact Assessment (EIA)
6. Energy Conservation and Sustainable Development (6 hrs)
Introduction to Energy Management, Energy Conservation, Energy efficiency and its need. Role of Non-conventional Energy Resources (Solar Energy, Wind Energy, Bio mass energy, hydro energy) in environmental protection. Sustainable development, Concept of Green building and eco friendly materials.

INSTRUCTIONAL STRATEGY

In addition to theoretical instructions, different activities pertaining to Environmental Studies like expert lectures, seminars, visits etc. may also be organized.

RECOMMENDED BOOKS

1. Sharma, BR, "Environmental and Pollution Awareness", Satya Prakashan, New Delhi.
2. Khitoliya, Dr. RK, "Environmental Pollution", S Chand Publishing, New Delhi.
3. Deswal and Deswal, "Environmental Science", Dhanpat Rai and Co. (P) Ltd. Delhi.
4. Bharucha, Erach, "Environmental Studies", University Press (India) Private Ltd., Hyderabad.
5. Dhamija, Suresh K, "Environmental Engineering and Management", SK Kataria and Sons, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	4	06
2	3	05
3	10	16
4	3	05
5	4	06
6	6	12
Total	30	50

COMPUTER FUNDAMENTALS AND INFORMATION TECHNOLOGY

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2 2

RATIONALE

Information technology has great influence on all aspects of life. 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 office automation tools using MS Office/Open Office/Libre Office, Internet concepts. This exposure will enable the students to enter their professions with confidence.

LEARNING OUTCOMES

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

- Identify computer hardware components, network components and peripherals. •
Install application and utility software.
- Use word processing software to prepare document.
- Use spreadsheet software to create workbook and automate calculation. •
Use presentation software to create interactive presentation.
- Browse information on the Web.

DETAILED CONTENTS

1. Basic Concepts of IT and Its Application (2hour)
Information Technology concept and scope, applications of IT.
2. Computer Hardware: (6hour)
Block diagram of a computer, components of computer system, CPU, Memory, Input devices; keyboard, Scanner, mouse etc., Output devices; VDU, LCD, Printers etc. Primary and Secondary Memory: RAM, ROM, optical disk (CD, DVD & Blue Ray Disk.), USB/Flash Drive, HDD (tracks and sectors), SSD
. Various Ports
3. Software Concepts: (2hour)
System software, Application software, Utility Software

4. MS-Word (6hour)
Features, File Management, Page Setup, Editing a document, Formatting a document, Formatting paragraph, Using find, replace mail merge
5. MS-Excel (6hour)
Features, Starting Excel, open worksheet, enter, edit, data formulae to calculate values, format data, create chart, printing chart, save worksheet
6. MS-PowerPoint (6hour)
Features, Starting PowerPoint, Slide layout, templates etc. Opening a new/existing presentation, Different views for viewing slides, Adding text boxes, Adding/importing pictures, Adding movie and sound, Adding tables and chart etc.
7. Internet Concepts: (2hour)
Introduction to LAN, WAN, PAN, MAN, Introduction of Internet, applications of internet like: e-mail and browsing, Various browsers.

LIST OF PRACTICAL EXERCISES

1. Given a PC, identify its basic hardware components, network components and peripherals. List their functions.
2. Installation of various application software and utility software.
3. Installation of I/O devices like scanner, printer and plotter.
4. Practice on various features/functions of Windows Operating System.

Word Processing (MS Word/OpenOffice Writer/LibreOffice Writer)

5. Creating/opening, saving and printing a document
6. Editing and formatting a document
7. Setting paragraph and page margins.
8. Adding header, footer and page numbering
9. Creating, inserting and formatting a table.
10. Spell checker, inserting date, time, special symbols, importing graphic images, drawing tools.

SpreadSheetProcessing(MSExcel/OpenOfficeCalc/LibreOfficeCalc)

- 11 Creating/opening,savingandprintingaworksheet.
- 12 Editingandformattingofworksheetsincludingchangingcolour,size,font, alignment of text and cell formatting.
- 13 Usingstatisticalfunctionslikesum,avg,min,max,if,countandcountif, lookup.
- 14 Creatingandformattingachart,Usingchartstoanalysedata.Useof filters.

PresentationSoftware(MSPowerPoint/OpenOfficeImpress/LibreOfficeImpress)

15. Creating,saving,openingandprintingapresentation.
16. Differentviewsofa slide.
17. Usingslidelayoutandtemplate.
18. Editingandformattingslidesbyaddingtitles,subtitles,text,background, watermark, table, charts, images and sound.
19. Viewingtheslideshowwithslidetransition,animationeffect,timingandorder.

InternetanditsApplications

20. Creatingan emailaccount.Sendingand receiveinge-mail.
21. Browsinganddownloadingofinformationfrominternet.
22. Surfingdifferentwebsiteslikeinstitutewebsite,StateBoardPSBTEwebsite,DTE website, NITTTR, Chandigarh website, AICTE website, various search engines like google, bing etc.

INSTRUCTIONALSTRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises.The students should be made familiarwith computerparts,peripherals,connectionsandproficientin makinguseofMS Office/Open Office in addition to working on internet.The student should be made capable of working on computers independently.

RECOMMENDED BOOKS

1. ComputerFundamentalsandInformationTechnologybyVipanArora,Eagle Parkashan, Jalandhar
2. ComputerFundamentalsbyPKSinha;BPBPublication,New Delhi
3. FundamentalsofComputerbyVRajaraman;PrenticeHallof India Pvt. Ltd.,New Delhi
4. MSOfficeforEveryonebySanjaySaxena;VikasPublishingHousePvt.Ltd., Jungpura, New Delhi

5. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	02	4
2	06	9
3	02	4
4	06	9
5	06	9
6	06	9
7	02	6
Total	30	50

ENGINEERINGDRAWING-I

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- 6

RATIONALE

Drawing is the language of engineers and technicians. Reading and interpreting engineering drawing 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.

Note:

- i) First angle projection is to be followed
- ii) Minimum of 16 sheets to be prepared and at least 3 sheets on AutoCAD
- iii) Instructions relevant to various drawings may be given along with appropriate demonstrations, before assigning drawing practice to students

LEARNING OUTCOMES

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

- Identify and use of different grades of pencils and other drafting instruments which are used in engineering field
- Draw free hand sketches of various kinds of objects.
- Utilize various types of lines used in engineering drawing.
- Read and apply different dimensioning methods on drawing of objects.
- Use different types of scales and their utilization in reading and reproducing drawings of objects and maps.
- Draw 2-dimensional view of different objects viewed from different angles (orthographic views)
- Draw and interpret complete inner hidden details of an object which are otherwise not visible in normal view
- Generate isometric (3D) drawing from different 2D (orthographic) views/sketches
- Identify conventions for different engineering materials, symbols, sections of regular objects and general fittings used in Civil and Electrical household appliances
- Use basic commands of AutoCAD.

DETAILED CONTENTS-CUM-PRACTICAL EXERCISES

1. Introduction to Engineering Drawing (03 sheets)

Introduction to drawing instruments, materials, layout and sizes of drawing sheets and drawing boards.

Different types of lines in Engineering drawing as per BIS specifications

Practice of vertical, horizontal and inclined lines, geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagonal, pentagon with the help of drawing instruments.

Free hand and instrumental lettering (Alphabet and numerals) – upper case (Capital Letter), single stroke, vertical and inclined at 75 degree, series of 5, 8, 12 mm of free hand and instrumental lettering of height 25 to 35 mm in the ratio of 7:4

2. Dimensioning Technique (01 sheet)

Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions)

Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., counter sunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches

3. Scales (02 sheets)

Scales – their needs and importance (theoretical instructions), type of scales, definition of R.F. and length of scale

Drawing of plain and diagonal scales

4. Orthographic Projections (06 sheets)

Theory of orthographic projections (Elaborate theoretical instructions)

Projection of Points in different quadrant

Projection of Straight Line (1st and 3rd angle)

Line parallel to both the planes

Line perpendicular to any one of the reference plane

Line inclined to any one of the reference plane.

Projection of Plane –Different lamina like square, rectangular, triangular and circle inclined to one plane, parallel and perpendicular to another plane in 1st angle only

Three views of orthographic projection of different objects. (At least one sheet in 3rd angle)

Identification of surfaces

5. Sections (02 sheets)

Importance and salient features

Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections.

Conventional sectional representation of various materials, conventional breaks for shafts, pipes, rectangular, square, angle, channel, rolled sections

Orthographic sectional views of different objects.

6. Isometric Views (02 sheets)

Fundamentals of isometric projections and isometric scale.

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

7. Common Symbols and Conventions used in Engineering (02 sheets)

Civil Engineering sanitary fittings symbols

Electrical fittings symbols for domestic interior installations

*8. Introduction to Computer Aided Drafting (03 sheets)

Basic introduction and operational instructions of various commands in Computer Aided Drafting. At least three 2 D drawings using Computer Aided Drafting of cube, cuboid, cone, pyramid, truncated cone and pyramid, sphere and combination of above solids.

***Computer aided drawing will be evaluated internally by sessional marks and not by final theory paper.**

INSTRUCTIONAL STRATEGY

Teachers 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. The institute should procure AutoCAD or other engineering graphics software for practice in engineering drawings. Teachers should undergo training in AutoCAD/Engineering Graphic. Separate labs for practice on AutoCAD should be established.

RECOMMENDED BOOKS

1. Singh, Surjit, "A Text Book of Engineering Drawing" Dhanpat Rai & Co., Delhi
2. Gill, P.S., "Engineering Drawing" S.K. Kataria & Sons, New Delhi
3. Bhatt, N.D., "Elementary Engineering Drawing in First Angle Projection" Charotar Publishing House Pvt. Ltd., Anand
4. Layall, J.S., "Engineering Drawing I & II" Eagle Parkashan, Jalandhar
5. Goel, D.K., "Engineering Drawing I", GBD Publication.

GENERAL WORKSHOP-I
(For Computer Science and Engineering, Information Technology, Electronics
and Communication Engineering)

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- 4

RATIONALE

In order to have a balanced overall development of diploma engineers, it is necessary to integrate theory with practical. General workshop practical included in the curriculum in order to provide hands-on practical knowledge of different tools and basic manufacturing processes. Basic knowledge of workshop technology and practical in various workshops develop the attitude of team working, safety awareness and development of right attitude. This subject provides miniature industrial environment in the educational institute.

LEARNING OUTCOMES

After completing the course, the students will be able to:

- Identify shop wise tools and equipment, their types, specifications and use with proficiency.
- Identify different types of materials, their uses and to maintain tools, equipment etc.
- Use and take measurements with the help of basic measuring tools/instrument.
- Select proper tools for a particular operation and use hand tools in different workshops with predefined outcome.
- Select materials, tools, and sequence of operation to make a job as per given specification/drawing.
- Prepare simple jobs independently and inspect the same according to drawing.
- Operate various tools and equipment in different workshops with predefined outcome, performance, standards.
- Follow the safety procedures and precautionary measures in different workshop with zero accidents.

DETAILED CONTENTS CUM PRACTICAL EXERCISES

Note: The students are supposed to come in proper workshop uniform 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 workshops will be explained for conduct of practical. The students should prepare sketches of various tools/jobs sequence of operations etc. in their practical notebook.

The following shops are included in the syllabus:

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

1. WELDING SHOP-I

Safety precautions of concerned shop and use of Personal Protective Equipment (PPE). Introduction and importance of welding as compared to other material joining processes. Classification of welding processes. Specifications and type of welding machines, welding parameters, welding methods, welding joints and welding positions. Classification and coding of electrodes and functions of electrode coating ingredients.

Demonstration of hand tools, arc welding machines, equipment and materials to be welded.

Jobs to be prepared:

Job I Practice of striking arc (Minimum 4 beads on 100 mm long M.S. flat) and Practice of depositing beads at different current levels. (Minimum 4 beads on M.S. flat at four different settings of current level).

Job II Making lap joint using arc welding (SMAW) on MS Flat.

2. FITTING SHOP-I

Safety precautions of concerned shop and use of Personal Protective Equipment (PPE). Introduction, functions, classification, specification and use of various types of holding, cutting, marking and measuring tools used in fitting shop like-Bench vice, V block, C clamp, Ball peen hammer, scriber, punches, files, hacksaw, surface plate, try square, calipers, steel rule, Vernier calliper, Micrometre and Vernier height gauge etc. Identification of materials like-Iron, Copper, Stainless Steel, Aluminium etc.), Identification of various steel sections like-flat, angle, channel, bar etc.). Introduction to various fitting shop operations/processes (Hacksawing, Drilling, Chipping and Filing).

Demonstration of various types of holding, cutting, marking and measuring tools used in fitting shop.

Jobs to be prepared:

Job I To make a rectangular job by performing the operations: Sawing, Marking, filing on MS work piece (75 x 50 x 6 mm) by making sides at 90 degree and surface flatness at 180 degrees and to maintain dimensions within an accuracy of ± 0.25 mm.

Job II To Make 'V' type cut-out profile from a square piece of MS flat using hand hacksaw, filing, marking and measuring operations.

3. SHEETMETALSHOP-I

3.1. Safety precautions of concerned shop and use of Personal Protective Equipment (PPE). Introduction and functions of various types of tools used in sheet metal shop: -snips, hand shearing, measuring tools, marking tools, striking tools and bending tools including types of stakes. Introduction and importance to different types of joints and fasteners used in sheet metal work. Introduction and purpose of different metals used in sheet metal work - black iron, galvanized iron, aluminium and stainless steel. Introduction of different types of Rivets, types of riveted joints, advantages, disadvantages and applications.

Demonstration of various types of holding, cutting, marking and bending tools used in fitting shop. demonstration of various raw materials used in sheet metal shop e.g. black-iron sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheet etc.

Jobs to be prepared:

Job I Shearing and bending practice on a sheet using hand shears/snips and stakes.

Job II To fabricate different types of sheet metal joint such as lap joint - single seam/double seam.

4. ELECTRICSHOP-I

Safety precautions of concerned shop and use of Personal Protective Equipment (PPE). Introduction, functions and specifications of different types of tools, wires, cables, switches, fuses, cleats, clamps, allied items, and accessories used in Electric shop. Introduction to battery charger and its functioning. Introduction to common electrical appliances such as auto electric iron, electric kettle, ceiling/table fan, desert cooler etc. Introduction to lead acid battery and nickel cadmium battery.

Demonstration and identification of common electrical materials with standard ratings and specifications such as wires, cables, switches, fuses, cleats, clamps and allied items, tools and accessories. Demonstration of common electrical appliances such as auto electric iron, electric kettle, ceiling/table fan, desert cooler etc. Demonstration of lead acid battery and nickel cadmium battery.

Job Practice:

Job I Identification of phase, neutral, earth wires for connection to domestic electrical appliances and their connections to three pin plugs.

Job II Practice in making series and parallel circuit. Make one lamp control by one switch circuit.

Job III Installation of battery and connecting two or three batteries in series and parallel.

5. CARPENTRY SHOP-I

Safety precautions of concerned shop and use of Personal Protective Equipment (PPE). Introduction to wood, timber their properties, uses & defects and their joints. Seasoning of wood and its advantages. Introduction, specifications and function of various types of tools used in carpentry (such as different types of Saws, C-Clamp, Chisels, Carpenter's vice, Mallets, Marking gauges, Scriber, Try-square, Steel tape, Wooden plane, Metallic Jack plane, Rulers) by segregating as cutting tools, supporting tools, holding tools, measuring tools etc. Types of wooden joints. Techniques/method of sharpening of jack plane cutter/blade. Demonstration of wood/timber, seasoning, various types of tools used in carpentry shop. Types of wooden joints.

Jobs to be Prepared:

Job I To make a rectangular wooden piece involving operations like planing, marking, sawing and measuring.

Job II Iron jack plane blade/cutter sharpening and Chisel sharpening practice.

Job III To make a Half Lap Joint (cross, L or T shape – anyone)

6. ELECTRONICS SHOP-I

Safety precautions of concerned shop and use of personal protective equipment (PPE), Difference between electrical and electronic devices, Tools used in electronics workshop - Tweezers, Screw drivers (different sizes), Insulated Pliers, Cutter, Snipper, Crimping tool, different types of Screw Drivers, L-Keys, Soldering Iron, Files, multimeter (analog and digital)

Demonstrate the jointing methods. mounting and dismantling as well as uses of the items mentioned below:

Various tools used in electronics shop. Various types of single, multi-cored insulated screened power, audio video, co-axial, general purpose wires/cables. Various types of fuses (slow acting, fast acting, thermal fuse and glass fuse). Various switches

Job Practice

JobI To make perfect solder joints and exposure to modern soldering and re soldering process.

JobII To makesoldering onPCBs and to remove components/wires by de-soldering.

JobIII Cut, strip, connect/solder/crimp different kinds of wires/cables (including coaxial and shielded cable) to different types of power/general purpose/ audio video/ telephone plugs, sockets jacks, terminal, binding, posts, terminal strips, connectors.

Note:

1. Workshopinstructorswillguideandhelpthestudentsthroughoutthepractical class in order to explain and complete the job according to syllabus and for providing necessary facilities to the students during performance of practical by observing the safety precautions
2. The Workshop Superintendent or Foreman Instructor or Instructor will demonstrate and deliver the theoretical instructions with regard to introduction, functions, classification and specification of tools, instruments, equipment, apparatus etc. of all the topics covered in the syllabus of workshops.
3. The Workshop Superintendent or Foreman Instructor will also conduct the mid-term test and final practical exam of this subject.

RECOMMENDED BOOKS

1. Workshop Practice By Swaran Singh, S.K.Kataria & Sons Publisher of Engineering Books New Delhi.
2. Workshop Practice by HS Bawa; Tata McGraw Hill Publishers, New Delhi.
3. Workshop Technology I,II,III ,by SK Hajra, Choudhary and AK Choudhary; Media Promoters and Publishers Pvt. Ltd. Mumbai
4. Workshop Technology Vol.I,II,III by Manchanda; India Publishing House, Jalandhar
5. Workshop Technology by B.S. Raghuwanshi ;Dhanpat Rai and Co., New Delhi

TRAFFIC AWARENESS & ROAD SAFETY CAMP (I)

A diploma holder must have knowledge of various types of traffic rules and regulations. Road safety education is vital for people of all ages. As a responsible citizen, you should be aware of each and every road safety rule. Observation is the key skill you need in ensuring road safety. By obeying safety rules and regulations, you can save yourself and others on the road. This camp covers the basic concepts of traffic rules and safety. Lectures will be delivered on following broad topics with the coordination of Dist. Traffic police. There will be no exam for this camp.

1. Road safety Scenario
2. School bus and traffic management
3. Awareness of Traffic Signs
4. Speeding Limit
5. Always Wear your Shields
6. Overtaking
7. Awareness through Hoardings
8. Walking & Safe cycling

