PM POLYTECHNIC
A Unit of Puran Murti Educational Society
Approved by AICTE, Ministry of HRD, Govt. of India,
Affiliated to State Board of Technical Education, Panchkula, Haryana

SCHEME FOR
FIRST SEMESTER (CIVIL ENGINEERING)

Sr. No.	Subject	Study Scheme Hrs/Week L	T	P	EVALUATION SCHEME INTERNAL ASSESSMENT Theory Max. Marks	Practical Max. Marks	EXTERNAL ASSESMENT (EXAMINATION) Written Paper Max. Marks	Hrs.	Practical Max. Marks	Hrs.	Total Marks
1.1*	Communication Skills - I	3	-	2	25	25	100	3	50	2	200
1.2*	Applied Mathematics - I	5	-	-	50	-	100	3	-	-	150
1.3*	Applied Physics – I	4	-	2	25	25	100	3	50	3	200
1.4*	Applied Chemistry – I	3	-	2	25	25	100	3	50	3	200
1.5*	Basics of Information Technology	-	-	4	-	25	-	-	100	3	150
1.6*	Engineering Drawing - I	-	-	6	-	25	100	3	25 (viva)	2	175
1.7*	General Workshop Practice - I	-	-	6	-	25	-	-	+100	3	150
# Student Centred Activities		-	-	3	-	25	-	-	-	-	25
Total		**15**	**-**	**25**	**125**	**250**	**500**	**-**	**375**	**-**	**1250**

* Common with other diploma programmes

+ Includes 25 marks for Viva-voce

Student Centred Activities will comprise of co-curricular activities like extension lectures, library studies, games, Hobby clubs e.g. photography, painting, singing, seminars, declamation contests, educational field visits, N.C.C.,NSS, Cultural Activities, Civil Defence/Disaster Management activities etc.

Campus
P M Polytechnic
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Website: www.pmkami.com
E-mail: director@pmkami.com

Department: Automobile Engineering – 1st Semester

Subject: Communication Skill –I (Theory)   **Subject Code: 120011**

Detailed Contents

Unit No.1 Communication skills

Topic No.1: Verbal & non verbal communication

Topic No.2: Process of communication

Topic No.3: Barriers to communication; overcoming strategies

Topic No.4: Listening & Speaking Skills & Sub Skills

Unit No.2 Grammar and usage

Topic No.5: Punctuation

Topic No 6: Articles-A, AN, The

Topic No.7: Framing Questions

Topic No.8: Verbs- classification: Main verb, Auxiliary verb, transitive verb and intransitive verbs

Topic No.9: Word Formation

Unit no. 3 Writing Skills

Topic No.10: Writing Paragraphs

Topic No.11: Picture Composition

Unit no. 4 Reading Skills

Topic No. 12: Unseen Comprehension passages

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3		-	25	-	100	3	-	-	125

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 & CompanyLtd., Delhi.
3. Communication Techniques and Skills by R. K. Chadha; Dhanpat Rai Publications, New Delhi.

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

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List of Practical
1. Introducing oneself
2. Introducing others
3. Greeting, Starting a Conversation
4. Leave Taking
5. Thanking, Wishing Well
6. Talking about Oneself
7. Talking about Likes and Dislikes

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	2	75

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Detailed Contents

Unit no 1 Algebra

Topic no 1: Concept of permutations and Combinations: Value of npr, ncr.

Topic no 2: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof)

Topic no 3: Partial fractions (linear factors, repeated linear factors, non-reducible quadratic factors excluding repeated factors)

Topic no 4: Determinants and Matrices – expansion of determinants (up to third order) by laplace expansion method, solution of equations (up to 3 unknowns) by Cramer's rule. Definition of matrix, addition, subtraction, multiplication of matrices (up to third order), minors and co-factors, inverse of a matrix by adjoint method (up to second order)

Unit no. 2 Trigonometry

Topic no.5: Review of ratios of some standard angles (0,30,45,60,90 degrees), T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications(without proof). Product formulae (Transformation of product to sum, difference and vice versa). T-Ratios of multiple angles, sub-multiple angles (2A,3A, A/2).

Unit no.3 Complex numbers

Topic no. 6: 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.

Unit no.4 Co-ordinate Geometry

Topic no.7: Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines, perpendicular distance formula (without proof)

Topic no.8: 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

Topic no.9: Equations of conics (ellipse, parabola and hyperbola), simple problems related to engineering (standards forms only)

STUDY SCHEME			EVALUATION SCHEME						Total Marks
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Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
5	-		50	-	100	3	-	-	150

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**

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Detailed Contents

Unit 1 Units and Dimensions

   Topic no 1: Physical quantities, Fundamental and derived units, Systems of units (CGS, MKS and SI units)

   Topic no 2: 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.)

   Topic no 3: Principle of homogeneity

   Topic no 4: Dimensional equations and their applications, conversion from one system of units to other for density, force, pressure, work, power, energy, velocity, acceleration Limitations of dimensional analysis

Unit 2 Force and Motion

   Topic no 5: Scalar and vector quantities – examples, representation of vector, statement of triangle law and parallelogram law Force, resolution and composition of forces parallelogram law of forces with Derivation

   Topic no 6: friction, laws of friction, types of friction, coefficient of friction, angle of friction.

   Topic no 7: 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

   Topic No 8: Projectile, horizontal and oblique projections (definitions) Derivation of time of flight, maximum height and horizontal range for oblique projections

   Topic no 9: Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period Relation between linear and angular velocity, linear acceleration and angular acceleration, relation between frequency and time period Centripetal force and centrifugal force (definition) Banking of roads (with derivation)

Unit 3 Rotational Motion

   Topic no 10: Definitions of torque, moment of inertia, radius of gyration

   Topic no 11: Derivation of rotational kinetic energy and angular momentum Conservation of angular momentum (qualitative)

Unit 4 Gravitation and Satellites

   Topic no 12: Gravity, acceleration due to gravity, Kepler's law of planetary motion Newton's law of gravitation Escape velocity (no derivation)

   Topic no 13: Satellites, natural satellites, artificial satellites, geostationary satellite

Unit 5 Work, Power and Energy

   Topic no 14: Work: definition and its SI unit, examples of zero work, positive work and negative work, Work done in moving an object on horizontal surface.

   Topic no 15: Power: definition and its SI unit Energy: definition and its SI units, Type - kinetic energy and potential energy with examples and their derivation

   Topic no 16: Principle of conservation of mechanical energy (for freely falling bodies), transformation of energy from one form to another

Unit 6 Properties of Matter

   Topic no 17: Elasticity, definition of stress and strain Different types of modulus of elasticity

   Topic no 18: Pressure – its units, gauge pressure, absolute pressure, atmospheric pressure

   Topic no 19: Surface tension – its units, capillarity, rise of liquid in capillary tube (derivation), applications of surface tension, effect of temperature and impurity on surface tension

   Topic no 20: Fluid motion, stream line and turbulent flow Viscosity, coefficient of viscosity; effect of temperature on viscosity

Unit 7 Heat and Temperature

   Topic no 21: Difference between heat and temperature on the basis of K.E. of molecules

   Topic no 22: Principles of measurement of temperature and different scales of temperature

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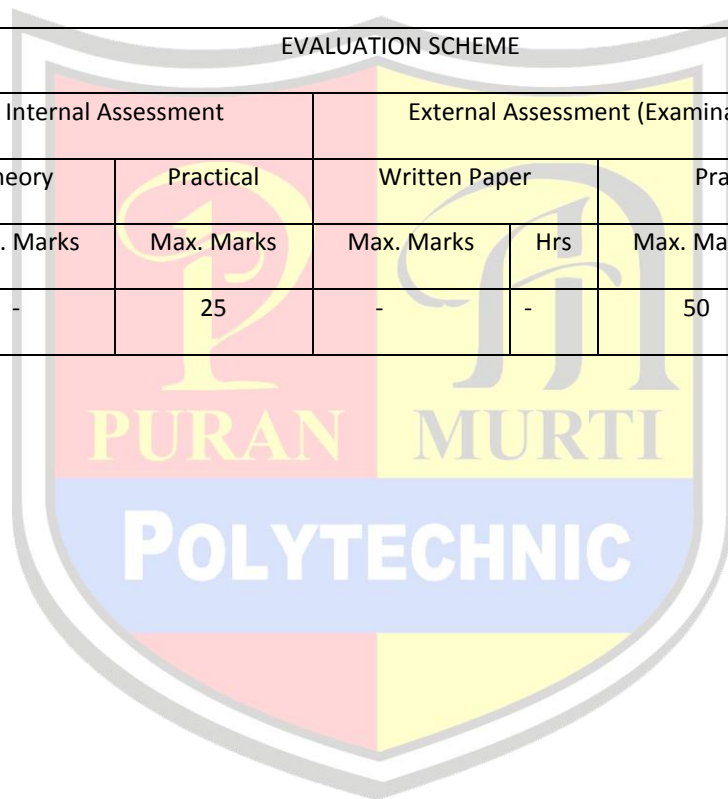Affiliated to State Board of Technical Education, Panchkula, Haryana

Topic no 23: Modes of transfer of heat (conduction, convection and radiation with examples) Thermal conductivity, coefficient of thermal conductivity (derivation)

Topic no 24: Properties of heat radiation Laws of Black Body Radiation: Stefan's law, Kirchoff's law, Wien's law

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3		-	25	-	100	3	-	-	125

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

SUGGESTED DISTRIBUTION OF MARKS

Topic No	Time Allotted(Hrs)	Marks Allotted(%)
1	10	16
2	12	20
3	6	10
4	6	10
5	10	16
6	8	12
7	12	16
Total	64	100

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List of practical

1. Familiarization with vernier calliper, screw gauge and spherometer and determination of their vernier constant 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

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	3	75

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Detailed Contents

Unit No.1 Basic Concepts of Chemistry

Topic No.1: Definition of chemistry and its importance

Topic No.2: S.I. Units of pressure, volume, density, specific gravity, surface tension and viscosity

Topic No.3: Matter, element, compound and mixtures, atoms, molecules, ions, symbols and formulae

Topic No. 4: Writing chemical formulae of simple chemical compounds and calculation of percentage composition of chemical compounds

Topic No.5: Chemical equations, thermo-chemical equations, balancing of chemical equations by HIT and TRIAL method

Unit No. 2 Atomic Structure and Chemical Bonding

Topic No.6: Introduction to atom and its constituent particles, Dalton's atomic theory, Rutherford's and Bohr's model of atom (overview only)

Topic No. 7: Atomic number, mass number, isotopes, isobars and isotones

Topic No. 8: Concept of atomic orbitals, shapes of s and p- orbitals, quantum numbers

Topic No.9: Aufbau principle, Pauli's exclusion principle, Hund's rule and electronic configuration of elements (upto Z=30)

Topic No. 10: Chemical bond, types of chemical bonding: ionic and covalent (sigma and pie bonds) with suitable examples.

Unit No.3 Water

Topic No.11: Sources of water

Topic No.12: Types of water based on dissolved salts;Hard water, soft water.Units to measure water hardness in ppm (mg/l) and simple numericals, degree Clark & degree French

Topic No. 13: Disadvantages of use of hard water in domestic and industrial applications (mainly boiler feed water)

Topic No. 14: Methods to remove water hardness by;Ion exchange process, Lime-soda process, Reverse Osmosis method

Topic No. 15: Quality criteria of drinking water as per BIS. (with special emphasis on hardness, total dissolved solids (TDS), Chloride, alkalinity present in water)

Unit No. 4 Solutions

Topic No. 16: 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

Topic No.17: Strength of a solution (i) Normality (ii) Molarity (iii) Molality as applied in relation to a solution.

Topic No.18: Definition of pH, simple numericals and different industrial applications of pH.

Topic No.19: Buffer solution and applications of buffer.

Unit No. 5 Electrolysis

Topic No.20: Electronic concept of oxidation and reduction

Topic No.21: Definition of the terms: Electrolytes, Non-electrolytes with suitable examples

Topic No.22: Faraday's Laws of Electrolysis and simple numericals

Topic No.23: Different industrial applications of 'Electrolysis'

Topic No.24: Applications of redox-reactions in battery technology such as (i) Dry cell (ii) lead acid battery and (iii) Ni-Cd battery

Unit No. 6 Environmental Chemistry

Topic No.25: Brief introduction to Environmental Chemistry and Pollution

Topic No.26: Causes and effects of air, water and soil pollutions

Topic No.27: Role of chemistry in controlling air, water and soil pollutions

Topic No.28: General idea of ozone depletion, global warming

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			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	25	-	100	3	-	-	125

TEXT 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

RECOMMENDED BOOKS

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

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPERSETTER

Sr. No	Topic	Time Allotted (Hrs)	Marks Allocation (%)
1	Basic concept of chemistry	07	14
2	Atomic structure and chemical bonding	11	20
3	Water	10	20
4	Solutions	07	16
5	Electrolysis	08	16
6	Environmental chemistry	05	04
	Total	**48**	**100**

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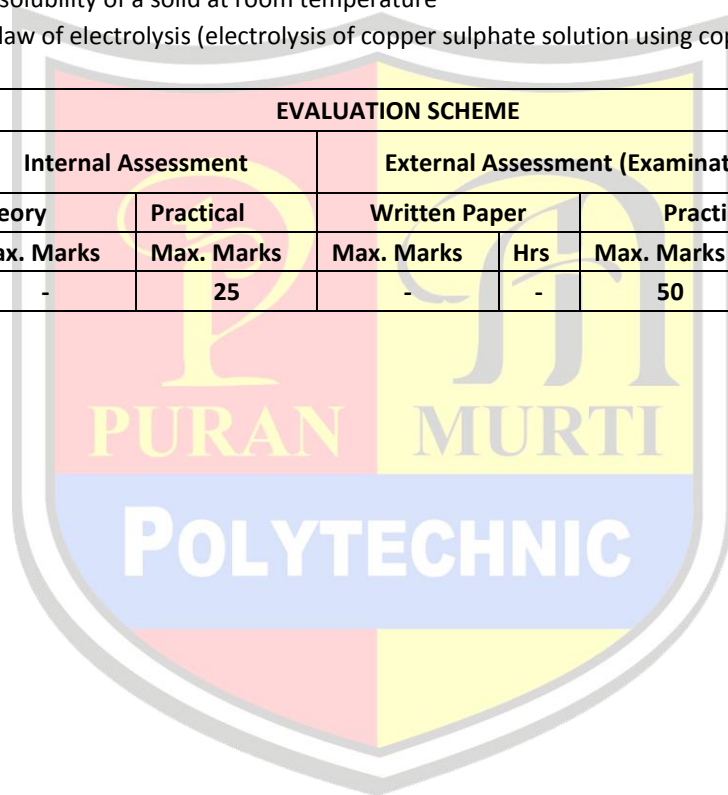
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Detailed Contents

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)

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	3	75

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Detailed Contents

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, financial transactions and many more Insurance
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, PROetc. 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
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

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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

STUDY SCHEME			EVALUATION SCHEME						Total Marks
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Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	4	-	50	-	-	100	3	150

TEXT 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

REFERENCE BOOKS:
1. Computers Today by SK Basandara, Galgotia Publication Pvt Ltd. Daryaganj, New Delhi.
2. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
3. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi

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Detailed Contents

Unit No.1: Drawing Office Practice, Lines and Lettering (2 Sheets)
Topic No.1: Definition of drawing, classification of drawing
Topic No.2: Drawing instruments such as mini drafter, drawing board, drawing sheet, drawing
pins, pencils, eraser, sandpaper, sharpener, cello-tape etc.
Topic no.3: Sizes and layout of standard drawing sheets and drawing boards
Topic no.4: Different types of lines in engineering drawing as per BIS specifications
Topic No.5: Definition and classification of letterings, free hand lettering (alphabets andnumerals) 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.

Unit No.2: Dimensioning (2 Sheets)
Topic No.6: 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.
Topic No.7: Dimensioning of overall sizes, circles, thread holes, chamfered surfaces, angles, tapered surface holes
equally spaced on PCD, counter sunk hole counter bored holes, cylindrical parts, narrow space and
gaps, radii, curves and arches.

Unit No. 3: Simple Geometrical Constructions used in Engineering Practice (2 Sheets)
Topic No.8: Construction of regular polygons (triangle, square, pentagon, hexagon) and Circles
Topic No.9: Ellipses (concentric circle method and Intersecting Arcs method)
Topic No.10: Parabola (rectangle and tangent method), cycloid, Freehand sketching of above geometrical shapes

Unit No. 4: Scale (2 sheets)
Topic No.11: Scale – their need and importance, Definition of representative fraction (R.F), find RF of given scale
Topic No.12: Construction of plain and diagonal scales

Unit No. 5: Principle of Projections (10 sheets)
.   Topic No.13: Principle of orthographic projection and introduction to first angle projection and third angle v
projection
Topic No.14: Projection of points situated in different quadrants (1 Sheet)
Topic No.15: Projection of lines, Lines inclined to one plane and parallel to the other and vice versa (1st &3rd
quadrants) (1 Sheet)
Topic No.16: 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)
Topic No.17: Drawing 3 orthographic views of given objects (6 sheets, at least one sheet   in 3rd Angle
Projection)
Topic No. 18: Identification of surfaces on drawn orthographic views from isometric object drawn (1Sheet)

Unit No. 6: Sectional Views (2 sheets)
Topic No.19: Need for sectional views –Drawing of different conventions for materials in sections,
conventional breaks for shafts, pipes, rectangular, square, angle, channel and rolled sections

Unit No.7: Isometric Views (2 sheets)
Topic No.20: Fundamentals of isometric projections (theoretical instructions) and isometric scales
Topic No.21: Isometric views of combination of regular solids like cylinder, cone, cube, prism and pyramid

Unit No.8: Development of Surfaces (2 sheets)
Topic No.22: Parallel line method (Prism and cylinder)
Topic No.23: Radial line method (Pyramid and Cone)

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	6	25	25	100	3	25	3	175

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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 Gujarat
3. A Text Book of Engineering Drawing by Surjit Singh published by Dhanpat Rai and Co., Delhi
4. Engineering Drawing by PS Gill published by SK Kataria and Sons, Delhi
5. Engineering Drawing by RB Gupta published by Satya Prakashan, New Delhi
6. Engineering Drawing by NS Kumar published by King India Publication, New Delhi

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Detailed Contents

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

    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

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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.

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, SolderingIron,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

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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, electronic products such as Radio, TV, CD players, VCD/DVD players, cassette recorder and players, Hi- Fi strips, connectors. The tasks should include making complete recording/ playback/ antenna/ speaker leads for common 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

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	6	-	50	-	-	100	3	150

TEXT BOOKS:

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary; Media Promoters and Publishers Pvt. Ltd.,
2. Workshop Technology by Manchanda Vol. I,II,III; India Publishing House, Jalandhar.

REFERENCE BOOKS:

1. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd. New Delhi
2. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
3. Workshop Technology by B.S. Raghuwansh;, Dhanpat Rai and Co., New Delhi
4. Workshop Technology by HS Bawa; Tata McGraw Hill Publishers, New Delhi

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