

Diploma in Piping Technology

Semester- I

SUBJECT: Applied Mathematics
CODE:
CATEGORY: General Education Component

Credit	Hours	Marks		
4	60	I	E	To
		30	70	100

Objectives

1. Acquire knowledge in matrix theory, a part of linear algebra, which has wider application in engineering problems.
2. To make the student knowledgeable in the area of Permutation and combination, trigonometric functions and to solve engineering problems based on the above concepts.
3. To make the student knowledgeable with basic and applied mathematics for further application.

Learning Outcomes

- The graduates will become familiar with fundamentals of various Mathematical concepts.
- Students will be able to set up and solve linear systems/linear inequalities graphically/geometrically and algebraically
- Students will be able to formulate problems in the language of sets and perform set operations, and will be able apply the Fundamental Principle of Counting, Multiplication Principle.
- Solve equations and inequalities, both algebraically and graphically, and Solving and model applied problems.

Unit	Topic	Key Learning
I	Algebra	<ul style="list-style-type: none">• Set theory• Permutation and Combination• Binomial theorem (expansion without proof)• Types of functions – linear, quadratic, polynomial, exponential and logarithmic
II	Trigonometric functions	<ul style="list-style-type: none">• Review of ratio of some standard angles (0, 30, 45, 60, 90 degrees)• Addition, subtraction and product formulae• Multiple and submultiples angles (2A, 3A, A/2)• Height and distance
III	Determinants and matrix	<ul style="list-style-type: none">• Introduction to Determinant and matrices• Algebra of matrices (up to third order)• Inverse of matrix by Adjoint method (up to second order)• Solution of system of linear equations by Cramer's rule
IV	Differential calculus	<ul style="list-style-type: none">• Rules of differentiation – simple standard forms (involving one variable)• Derivatives of algebraic and trigonometric functions• Differentiation of function of a function• Chain rule
V	Integral calculus	<ul style="list-style-type: none">• Integral of standard forms• Simple integration by substitution• Integration by parts and by fractions (for linear factor only)• Evaluation of definite integrals

Suggested Readings:

- NCERT- 11th and 12th Mathematics.

- Advanced Engineering Mathematics, E. Kresyzig, John Wiley and Sons. (latest edition).
- Higher Engineering Mathematics, B.S. Grewal, Khanna Publications
- Advanced Engineering Mathematics, R.A Jain and S.R.K Iyengar. Narosa Publications.
- Engineering Mathematics, N.P Bali, Laxmi Publications.

SUBJECT: Fundamentals of Computer

CODE:

CATEGORY: General Education Component

Credit	Hours	Marks		
		I	E	To
2	30	15	35	50

Objectives

- The syllabus introduces students to basic information and communication technology and proper paradigms that need to be implemented to develop any kind of computer applications. The course will help in developing the basic technical skills by hands on experience.

Learning Outcomes

- Students will be able to the use the computer for basic purposes of preparing personnel/business letters, viewing information on Internet, sending mails, using internet banking services etc.
- Understand basic computer operations and ICT applications.
- Understand Network troubleshooting.
- Undertake data entry services

Unit	Topic	Key Learning
I	Introduction to Computer System:	1.1 What is Computer, Basic Applications of Computer; Block Diagram of Computer System 1.2 Input / Output Devices, Computer Memory, Concepts of Hardware and Software, Data and Information; Applications of IECT. 1.3 Computer Virus: Definition, Types of viruses, Characteristics of viruses, Anti-virus software, 1.4 Introduction to number system
II	Operating System	<ul style="list-style-type: none"> • Overview of operating system: Definition, Functions of operating system, Need and its services, Types of operating system, Batch Processing, Spooling, Multiprocessing, Multiprogramming • , Time-Sharing, On-Line Processing, Real-Time Processing Basics of window operating system • Comparison between DOS and windows, Switching between DOS and windows • Comparison between Unix and Windows
III	Understanding Office Applications	<ul style="list-style-type: none"> • Introduction to MS Word, Introduction to MS Excel and its applications, Introduction to MS PowerPoint, Menus, Shortcuts, • Document types, Formatting documents • spread sheet and presentations, working with Spreadsheets, Different templates, Macros, Mail merge
IV	Networking	<ul style="list-style-type: none"> • Network Technologies, Introduction to Internet and protocols: TCP/ IP, Network connecting devices, Topologies • HTTP, HTTPS DNS, Hub, Switches

		<ul style="list-style-type: none"> Router, Repeater, Firewalls, Digital Signature.
V	Introduction to World Wide Web and ERP	<ul style="list-style-type: none"> WWW and Web Browsers Introduction, Objectives, Concept of internet Overview of search engines, popular search engines in use, Surfing the web and websites, Hosting your websites, Planning and Developing the websites, Internet service provider. Defining ERP, Origin and Need for an ERP System, Benefits of an ERP System, ERP Tools and Software, ERP Selection Methods and Criteria, ERP Selection Process, , ERP Implementation Lifecycle, Pros and cons of ERP implementation, Factors for the Success of an ERP Implementation, Brief introduction to SAP

Suggested Readings:

Text Books

1. Computers and Beginners by Jain, V.K.;
2. Computer Fundamentals by Anita Goel, Pearson.

Reference Books

1. Introduction to Information Technology, Leon Tech World by Leon and Leon
2. Foundations of Computing, BPB Publication by Sinha, Kr. Pradeep and Preeti Sinha;
3. Word Processing and Typing by Sharon Spencer, Heinemann.
4. MS Office by S.S. Srivastava, Firewall Media.
5. Microsoft Office 2010 by Bittu Kumar, V & S Publications
6. Data Communication and Networking by Behrouz.A. Forouzan, McGraw Hill

Web Links<http://cec.nic.in/E-Content/Pages/default.aspx>

Subject Name: Fundamental of Computers

Lab

Paper Code:

Total Marks: 50

Credit	Hours	Marks		
		I	E	To
2	60	35	15	50

List of Experiments

1. Troubleshooting
2. Practical based on to be exposed/shown various components and supposed how to switch on a computer.
3. Handling Boot Setup, Installation of Operating System, Connecting your client to server, User and Workgroup Handling, General Operating system handling and related topics.
4. WordPad, Notepad, Sticky Note, Snipping tool, Paint
5. M.S. Word
6. MS-Excel- Creating charts, Creating tables
7. MS-PowerPoint
8. MS-Outlook
9. Case study on Operating systems (Windows/ Ubuntu/ Android/IoS)
10. Networking
11. Software: Preparatory and open domain
12. ERP software practice

SUBJECT: Communication Skills

CODE:

CATEGORY: General Education Component

Credit	Hours	Marks		
		I	E	To
2	30	15	35	50

Objectives

- To inculcate in students professional and ethical attitude, effective communication skills, teamwork, skills, multidisciplinary approach and an ability to understand engineer's social responsibilities.
- To inculcate in students written communication skills.

Learning Outcomes

- The syllabus introduces students to have basic skill set of channelizing information, self-development, decision making and interpersonal skills.

Unit	Topic	Key Learning
I	Communication	<ul style="list-style-type: none"> • Meaning of Communication, Importance of Communication, Types of communication. Process of communication • Communication network in an organization • Barriers to communication, Essentials of good communication
II	Remedial English Grammar Understanding and applying Vocabulary	<ul style="list-style-type: none"> • Articles, agreement between verb and subject, uses of tenses, Modal and their uses, Prepositions. • One word substitutes, Synonyms and Antonyms Word formation:-Prefixes, Bases and Suffixes.
III	Listening Skills	<ul style="list-style-type: none"> • The process of listening, Types of listening, Benefits of effective listening • Barriers to listening, listening to announcements at work place.
IV	Reading Skills	<ul style="list-style-type: none"> • Process and methodologies of reading, Skimming and scanning, Levels of reading, Proofreading, Summarizing, Precise writing • Unseen comprehension passage, Note taking and reviewing • convert the given information into charts and graphs.
V	Writing Skills	<ul style="list-style-type: none"> • Main Forms of Written Communication: Notices, Drafting an E-mail • Correspondence: Personal and Official, Notices, • Technical Report Writing, Preparing agenda and minutes of meeting

Suggested Readings:

- Sethi, J & et al. A Practice Course in English Pronunciation, Prentice Hall of India, New Delhi.
- Sen, Leena. Communication Skills, Prentice Hall of India, New Delhi.
- Prasad, P. Communication Skills, S.K. Kataria & Sons.
- Bansal, R.K. and J.B. Harrison. Spoken English, Orient Language.
- Roach Peter. English Phonetics and Phonology.
- A.S. Hornby's. Oxford Advanced Learners Dictionary of Current English, 7th Edition.

- Prasad, P. The Functional Aspects of Communication Skills, Delhi.
- McCarthy, Michael. English Vocabulary in Use, Cambridge University Press.
- Rajinder Pal and PremLata. English Grammar and Composition, Sultan Chand Publication.
- Idioms & Phrases (English-Hindi), Arihant Publication (India) Pvt. Ltd.
- One Word Substitution, Dr. Ashok Kumar Singh, Arihant Publications (India) Pvt, Ltd

Subject Name Communication Skills Lab

Paper Code:

Total Marks: 50

Credit	Hours	Marks		
		I	E	To
2	60	35	15	50

List of Experiments:

1. Greeting and starting of conversation.
2. Nonverbal communication techniques during conversation.
3. Verbal communication techniques during conversation.
4. Group discussion.
5. Extempore public speaking.
6. Reading activity
7. Situational dialogues /Role play.
8. PPT presentation technique.

SUBJECT: Basics of Plumbing

CODE:

CATEGORY: Skill Education Component

Credit	Hours	Marks		
		I	E	To
2	30	15	35	50

Objectives

- To make student understand about the types of pipes , their usage and tools used in plumbing.
- To make student understand different types of plumbing system.
- To make student understand the basic fittings used in plumbing.
- To make student learn about the basic civil work requires in plumbing.

Learning Outcomes

- Knowledge of and familiarization with the materials with which the plumbing work is carried out.
- Knowledge of various plumbing tools and their usage.
- Students will be able to learn about the various types of plumbing system.
- Students will be able to learn about the pipe fittings.

Unit	Topic	Key Learning
I	Introduction to Plumbing	<ul style="list-style-type: none"> • Introduction • Safety precautions and elementary first aid • Types of water– grey, black, potable water. • Different types of pipes (Flexible piping), material and orientation and their usage. • Pipe joining tools and Pipe Joint Methods - Soldering, Brazing and Welding
II	Plumbing Tools	<ul style="list-style-type: none"> • Hand tools and its uses– Steel rule, Steel tape, Marking Media, Scribes, Surface gauge, Hammer, Marking punch, wrenches, plier, screw driver, pipe cutter, bender, threading tool – types of threads & its application, hacksaw, metal, Bench vice, Vices elements of a file, Chisel, Allen Key, file shapers, pinning of files try square, Calipers. • Locking devices: Types of nuts, locking devices for nuts, Clamps & Hooks. • Cutting Tools: Wall and Pipe cutting tools :Manual and Power • Safety Tools
III	Plumbing Systems	<ul style="list-style-type: none"> • Introduction • Types of Plumbing System • List of Codes, standards and abbreviations used in plumbing systems. • Fixtures - Purpose served, types, parts of fixtures, Installation, Uninstallation, repair, ,waste disposal :Wash Basins, Kitchen Sink, Faucets, Floor Drains, Showers, Water Closet, Parts and Types of IWC , EWC, Flush Tanks (mounting methods), Concealed flush tank and flush valves, Urinals, Bathtub
IV	Pipe fittings	<ul style="list-style-type: none"> • Type of Fittings - elbows, weld tee, stub in, couplings, reducers, weld cap, screwed and socket welded fittings, Pipe nipples, flanged fittings and use of fittings..

		<ul style="list-style-type: none"> Leak detector
V	Basics of Civil Work	<ul style="list-style-type: none"> Chipping & Digging : Methods of Chipping & Digging (Manual & Power type) ,Safety Procedure for Chipping & Digging. Cement mixing : Methods of cement mixing, Process of cement mixing. Brick Handling: Brick, Brick Bonding, Arranging of bricks for plumbing Masonry

Suggested Readings :

- 1. Residential Construction Academy : Plumbing by Michael Joyce and Ray Holder**
- 2. Design and Practical Handbook on Plumbing by Cr Mohan , Vivekanand**
- 3. Practical Book on Plumbing and Sanitation by S.K.Jain and Amit Agarwal**

SUBJECT: Hydraulics and Pumping system

CODE:

CATEGORY: Skill Education Component

Credit	Hours	Marks		
		I	E	To
2	30	15	35	50

Objectives

- To make student learn about the basic hydraulic concepts.
- To make student learn about the pressure and its measurement.
- To make student understand the basic laws followed in hydraulics.
- To give knowledge about the pumps and their selection
- To give knowledge about the various valves used in plumbing work.

Unit	Topic	Key Learning
I	Basic Concepts and Definition of Fluids	<ul style="list-style-type: none"> • Fluid – Definition, ideal fluid & real fluid • Fluid Properties, Newton law of viscosity • Types of Fluid Flow - Closed & channel type flow, laminar, turbulent, steady, unsteady flow, Uniform & Non uniform flow.
II	Pressure and Measurement Devices	<ul style="list-style-type: none"> • Pressure –definition, formula, units • Gauge & absolute pressure, Vacuum pressure • Measurement - piezometer, Manometer – U-Shaped, Bourdan gauge • Introduction to fluid flow from Origin in piping system • Hydraulic forces on submerged surfaces(basic)
III	Basic of Fluid Mechanics	<ul style="list-style-type: none"> • Buoyancy- Archimedes principal • Continuity Equation • Bernoulli’s equation • Types of head losses in pipes and their calcutaions • Units & conversation • Hazen williams formula • Mannings formula
IV	Pump Selection	<ul style="list-style-type: none"> • Pump – Types of Pumps, Pump laws and applications • Pump selection: Transfer pump, Booster pump Circulation pump, Pressurize tank sizing, submersible pumps
V	Valves	<ul style="list-style-type: none"> • Valves (Gate, Globe, Angle), Pressure Reducing Valve, Water Hammer Resistor, Float Valve, Foot Valve, N R V(Non Return Valve), Automatic Air Vent, Strainer

Suggested Readings:

1. **Water Pump and Pumping System by James Rishel**
2. **Hydraulics & Fluid Mechanics including Hydraulic Machines by P.N. Modi**
3. **A textbook of Fluid Mechanics and Hydraulic Machines by R.K. Bansa**

SUBJECT: Piping System Drawing

CODE:

CATEGORY: Skill Education Component

Credit	Hours	Marks		
		I	E	To
3	90	70	30	100

Objectives

1. Understand and appreciate the importance of drawing.
2. Understand the basic principles of drawing used in piping system.
3. Understand the different steps in producing drawings according to BIS conventions

Learning Outcomes

1. The student will become familiar with fundamentals of various objects and abbreviations and thus acquire the capability to applying them
2. The graduates will become familiar with fundamentals of engineering design. Understanding the concept generation, design optimization and evaluation.
3. Students will be able to effectively draw and read piping layout and make floor plan for the buildings.

List of Practicals

- Prepare drawing sheet by using different types of lines
- Practice for projection of point with proper rules of dimensioning.
- Practice for projection of line with proper rules of dimensioning.
- Practice for projection plane with proper rules of dimensioning.
- Prepare drawing sheet of orthographic projection with proper rules of dimensioning.
- Prepare drawing sheet of isometric projection of pipes with proper rules of dimensioning.
- Prepare drawing sheet of a residential project with pipe dimensioning and abbreviations.
- Prepare a plumbing layout for a commercial project’s typical floor plan with legends used in plumbing (pipe colour, abbreviations, symbols etc.).
- Prepare Enlarged Kitchen & Utility-Plumbing Layout with legends used in plumbing (pipe colour, abbreviations, symbols etc.).
- Prepare Plumbing layout for a multi storied buildings with riser diagram and legends used in plumbing (pipe colour, abbreviations, symbols etc.).
- Prepare a Sanitary drainage schematic layout legends used in plumbing (pipe colour, abbreviations, symbols etc.).

Suggested Readings:

1. **Piping Drafting and Design** by Roy A. Parisher, Gulf Professional Publishing
2. **Structural , Civil and Pipe Drafting** by David Goetsch.

Reference Book

1. **The Piping Guide: Foe the Design and Drafting of Industrial Piping System**

SUBJECT: Basics of Plumbing Lab
CODE:
CATEGORY: Skill Education Component

Credit	Hours	Marks		
		I	E	To
1	30	35	15	50

Objectives

Understand and appreciate the importance of drawing.

Understand the basic principles of drawing used in piping system.

Understand the different steps in producing drawings according to BIS conventions

Learning Outcomes

The student will become familiar with fundamentals of various objects and abbreviations and thus acquire the capability to applying them

The graduates will become familiar with fundamentals of engineering design. Understanding the concept generation, design optimization and evaluation.

Students will be able to effectively draw and read piping layout and make floor plan for the buildings.

List of Practicals

1. Demonstrate Safety measures
 - 1.1 First Aid Procedures
 - 1.2 Different types of accident that may happen during plumbing work.

2. Practical's on using different tools, Hammer, Marking punch, Wrenches, Plier, Screw Driver, Pipe Cutter, Bender, Threading tool, Hacksaw, Meta;, Bench Vice, Vices elements of a file, file shapers, pining of files try square, calipers.

3. Demonstration of simple fitting and drilling operations for
 - 3.1 Internal threading of through holes using hand tools
 - 3.2 External threading : file and die stock
 - 3.3 Fixing Locking devices
4. Chipping and digging for laying the pipes by reading pipe layout.
5. Read layout, laying and jointing of pipes (Join GI/PPR/PVC/SW)
6. Usage of different Pipe Fittings (Elbows, bends etc)
7. Preparation of Cement mortar (chase cutting and mortar filling) Preparation of Cement Concrete, Plastering of bricks, Encasing pipes in concrete (SW, AC,CI, PVC)

SUBJECT: Hydraulic and Plumbing Systems Lab

CODE:

CATEGORY: Skill Education Component

Credit	Hours	Marks		
		I	E	To
1	30	35	15	50

Objectives

- Understand and appreciate the importance of drawing.
- Understand the basic principles of drawing used in piping system.
- Understand the different steps in producing drawings according to BIS conventions

Learning Outcomes

- The student will become familiar with fundamentals of various objects and abbreviations and thus acquire the capability to applying them
- The graduates will become familiar with fundamentals of engineering design. Understanding the concept generation, design optimization and evaluation.
- Students will be able to effectively draw and read piping layout and make floor plan for the buildings.

List of Practicals

1. Basic Installation techniques:

- Carry out Pre-installation techniques
- Align and join pipes and fixtures
- Test installed fittings and fixtures
- Cutting, bending and joining of fittings and fixtures

2. Bathroom & Sanitary Fixtures : Its installation and repairs

- Water Closet, Wash Basin ,Bath tub, Showers & Diverters, Urinal
- Installation of Sanitary Ware like Water Closet, Wash Basin, Urinal etc.
- Installation of Wall Mixers
- Installation of Single Lever Diverters
- Installation Flush Valves, Flush Tanks, Concealed Cisterns,
- Installation of water saving products such as pressmatic taps & sensor based taps
- Installation of Bath Tub, Whirpool, SPA
- Installation of Shower Panels, Steam Cabins
- Installation of Glass/Shower Enclosures
- Installation of Electrical Geysers.

3. Kitchen Fixtures and its installation

4. Maintenance and repair of Plumbing system.