ENGLISH AND COMMUNICATION SKILLS - II

L T P
3 - 2

RATIONALE

Language is the most commonly used medium of self-expression in all spheres of human life – personal, social and professional. A student must have a fair knowledge of English language and skills to communicate effectively to handle the future jobs in industry. The objective of this course is to enable the diploma holders to acquire proficiency, both in spoken (oral) and written language. At the end of the course, the student will be able to develop comprehension skills, improve vocabulary, use proper grammar, acquire writing skills, correspond with others and enhance skills in spoken English. It is expected that each polytechnic will establish a **communication skill laboratory** for conducting practicals mentioned in the curriculum.

DETAILED CONTENTS

1. Facets of Literature   (14 hrs)

    1.1   Short stories

        1.1.1   The Portrait of a Lady - Khushwant Singh
        1.1.2   The Doll's House – Katherine Mansfield
        1.1.3   The Refugees – Pearl S. Buck

    1.2   Prose

        1.2.1   Walking Tours – R.L. Stevenson
        1.2.2   A Dialogue on Civilization – C.E.M. Joad
        1.2.3   The Sign of Red Cross – Horace Shipp

    1.3   Poems

        1.3.1   All The World's A Stage – W. Shakespeare
        1.3.2   Say Not, The Struggle Nought Availeth – A.H. Clough
        1.3.3   Pipa's Song – Robert Browning

2. The Art of Précis Writing   (04 hrs)

3. Grammar and Usage   (08 hrs)

    3.1   Narration
    3.2   Voice
    3.3   Idioms and Phrases

4. Correspondence   (04 hrs)

    4.1   Business Letters

      4.2   Personal letters

5.   Drafting   (06 hrs)

      5.1   Report Writing
      5.2   Inspection Notes
      5.3   Memos, Circulars and Notes
      5.4   Telegrams
      5.5   Press Release
      5.6   Agenda and Minutes of Meetings
      5.7   Applying for a Job

6.   Glossary of Technical & Scientific Terms   (04 hrs)

7.   Communication   (08 hrs)

      7.1   Media and Modes of Communication
      7.2   Channels of Communication
      7.3   Barriers to Communication
      7.4   Listening Skills
      7.5   Body language
      7.6   Humour in Communication

LIST OF PRACTICALS

1. Practice on browsing information from Internet
2. Group Discussions
3. Mock Interviews
4. Telephone Etiquette – demonstration and practice
5. Situational Conversation with feedback through video recording
6. Presentation on a given theme (using PowerPoint)
7. Exercises leading to personality development like mannerism, etiquettes, body language etc.
8. Reading unseen passages
9. Writing (developing) a paragraph
10. Exercises on writing notices and telephonic messages

Note:
1. The Text Book on "English and Communication Skills, Book-II By Kuldip Jaidka et. al. developed by NITTTR, Chandigarh is recommended to be used for teaching & setting-up the question papers.
2. A communication laboratory may be set up consisting of appropriate audio-video system with facility of playing CDs/DVDS and a video camera for recording the performance of each student with play back facility. A set of CDs from any language training organization e.g. British Council etc. may be procured for use of students.
3. Elements of body language will be incorporated in all practicals
4. The practical exercises involving writing may also be included in Theory Examination.

RECOMMENDED BOOKS

1. English and Communication Skills, Book-II By Kuldip Jaidka, Alwainder Dhillon and Parmod Kumar Singla, Prescribed by NITTTR, Chandigarh & Published By Abhishek Publication, 57-59, Sector-17, Chandigarh

2. Essentials of Business Communication by Pal and Rorualling; Sultan Chand and Sons

3. The Essence of Effective Communication, Ludlow and Panthon; Prentice Hall of India

4. New Design English Grammar, Reading and Writing Skills by AL Kohli (Course A and course B), Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,

5. New Design English Reading and Advanced Writing Skills for Class XI and XII by MK Kohli and AL Kohli; Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,

6. A Practical English Grammar by Thomson and Marlinet

7. Spoken English by V Sasikumar and PV Dhamija; Tata McGraw Hill

8. English Conversation Practice by Grount Taylor; Tata McGraw Hill

9. Developing Communication Skills by Krishna Mohan and Meera Banerji; MacMillan India Ltd., Delhi

10. Business Correspondence and Report Writing by RC Sharma and Krishna Mohan; Tata McGraw Hill Publishing Company Ltd. New Delhi

11. Communication Skills by Ms R Datta Roy and KK Dhir; Vishal Publication, Jalandhar

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	14	30
2	4	10
3	8	15
4	4	10
5	6	15
6	4	5
7	8	15
Total	**48**	**100**

APPLIED MATHEMATICS – II

L T P
5 - -

RATIONALE

Applied mathematics forms the backbone of engineering studies. In continuation to the basic elements of differential calculus and integral calculus taught in previous course and their applications, statistics and probability have been included in this course. This course will develop analytical abilities amongst the students and will provide base for continuing education base to the students.

DETAILED CONTENTS

1.   Algebra   (16 hrs)

    1.1   Matrix: Algebra of matrices, inverse, elementary row/column transformation, linear dependence, rank of matrix, type of matrix, Eigen pairs, Cayley-Hamilton theorem

    1.2   Determinants: Elementary properties of determinants of second and third order, multiplication system of algebric equation, consistency of equation, Cramme's rule

    1.3   Vector Algebra: Definition of vector and scalar quantities, addition and substration of rectors. Dot and cross product of two vectors. Angle between two vectors, applications of dot and cross product in Engineering problems.

2.   Co-ordinate Geometry   (16 hrs)

    2.1   Point in space. Distance between two points, ratio

    2.2   Straight line, finding the equation of straight line, shortest distance between two points

    2.3   Plane

    2.4   Sphere in space

3.   Differential Calculus   (16 hrs)

    3.1   Successive differentiation. Libnez's theorem

    3.2   Partial differentiation: Partial derivatives, total differential co-efficient, chain rule. Euller's theorem of homogeneous function, Jacobians, curl, gradience and divergent and some identities among them

3.3 Differential equation: Order, degree and meaning of solution of differential equations. Linear, non-linear differential equation, first order equation (separable forms, linear and Bernoulli's form, exact equation and their solutions), second order linear equations (linear equations with constant co-efficients homogeneous and non-homogeneous equation, equations reduciable to linear form with constant co-efficients)

4. Integral Calculus (18 hrs)

4.1 Laplace transform, solution of differential equation by Laplace transform

4.2 Beta and gamma function

4.3 Fourier series

5. Statistics and Probability (14 hrs)

10.1 Measure of central tendency: Mean, median, mode, mean derivation, strandard deviation, rank and rank correlation

10.2 Probability: Law of probability and conditional probability

10.3 Binomial distribution and poission distribution

10.4 Continuous and normal distribution

10.5 Curve fitting by least square method

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 and Sons, Delhi

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

5. Engineering Mathematics by Dass Gupta

6. Engineering Mathematics by C Dass Chawla, Asian Publishers, New Delhi

7. Comprehensive Mathematics, Vol. I & II by Laxmi Publications

8. Engineering Mathematics, Vol I, II & III by V Sundaram et.al, Vikas Publishing House (P) Ltd., New Delhi

9. Engineering Mathematics by N.Ch.S.N Iyengar et.al, Vikas Publishing House

(P) Ltd., New Delhi

10. Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,

11. Engineering Mathematics, Vol I & II by AK Gupta, Macmillan India Ltd., New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	20
2	16	20
3	16	20
4	18	25
5	14	15
Total	**80**	**100**

APPLIED PHYSICS – II

L T P
4 - 2

RATIONALE

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

DETAILED CONTENTS

1. Classification of materials   (4 hrs)

    Classification of materials into Conducting materials, Insulating materials, semiconducting materials with reference to their atomic structure, magnetic material (para, dia and ferro)

2. Fundamentals of D.C. and A.C.   (8 hrs)

    2.1   D.C: Electric current, Ohm's Law, Series and parallel combination of resistances, Kirchoff's law and their simple applications. Principle of Wheatstone's bridge and its application in meter bridge and post office box

    2.2   A.C: Sinusoidal current and EMF. Peak, and r.m.s values, resistive, inductive, and capacitive circuits singularly and in combination, reactance, impedance

3. Moving Charge & Magnetic Field   (10 hrs)

    Magnetic behaviour of current carrying conductor; Magnetic behaviour of current Carrying solenoid; concept of Magnetic Field: Magnetic line of forces;force on a current -carrying conductor in a magnetic field ; fleming's Left hand rule ; force on a charge moving in a magnetic field; motion of charged particles in a magnetic field; Magnetic field due to a current carrying conductor(Biot- Savart law); Force between two parallel current carrying conductors .

4. Modern Physics   (12 hrs)

    Laser- Absorption and emission of energy by atom, spontaneous and stimulated emission, Population inversion, Main component of Laser and types of Laser: Ruby Laser, He,- Ne and semiconductor Laser and their applications. Super Conductivity- Phenomenon of super conductivity, effect of magnetic field, critical field, type I & type II super conductors and their applications. Radioactivity, nuclear stability, radio active emission, radiation damage, concept of nuclear fission and fusion and their applications.

5.   Application of Optics: (6 hrs)

     5.1   Concept of interference and diffraction.
     5.2   Optical slide film projector and OHP (principle and operation)
     5.3   Introduction to fibre optics, optical fibre materials, types, light propagation. Critical angle, total internal reflection, optical sensor
     5.4   Application of optical fibres in telecommunication

6.   Semi Conductor Physics and its Application   (12 hrs)

Energy band in solids, classification of solids into conductors, insulators and semiconductors on the basis of energy band structure. Intrinsic and extrinsic semiconductors, Electrons and holes as charge carriers in semiconductors, effect of temperature in conduction in semiconductors, P-type and N-type semiconductors, PN junction formation, barrier voltage, forward and reverse biasing of a junction diode, PN junction device characteristics, formation of transistor, transistor action, base, emitter and collector currents and their relationship, LEDs, photoelectric effect, photo devices and their applications..

7.   Non Conventional Energy Sources   (12 hrs)

     7.1   Wind Energy: Introduction, scope and significance, measurement of wind velocity by anemometer, general principle of wind mill, India's wind energy programme.

     7.2   Solar Energy: Solar radiation and potentiality of solar radiation in India, unit of solar radiation, solar constant measurement of solar radiation by pyranometer. Uses of solar energy: solar cooker, solar water heater, solar photovoltic cells, solar energy collector, solar by planets in India, Modern applications in technology (Qualitative only).

LIST OF PRACTICALS

1. To verify the Laws of Series and Parallel combination of resistances by P.O.Box

2. To verify the Laws of Series and Parallel combination of resistances by Meter Bridge.

3. Determination of wave length of He- Ne Laser

4. To draw the characteristics of a transistor

5. Verification of Ohm's law.

6. Verification of Kirchoff's laws.

7. Conversion of galvano meter into ammeter & voltmeter.

8. Calculation of peak and rms values of a given ac with the help of an oscilloscope.

9.   To measure impedance of a given coil with the help of A-V method.

10.   To Draw the characteristics of PN Junction Diode & Determination of Static & Dynamic Resistance.

11.   Measurement of solar intensity with the help of pyranometer/ Lux meter

12.   To measure thickness of paper by two optically plane glass plates using interferance fringes.

RECOMMENDED BOOKS

1.   Applied Physics Vol. II, 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.   Physics Laboratory Manual by PK Palanisamy, Scitech Publications

8.   Fundamentals of Physics by Resnick and Halliday, Asian Books Pvt. Ltd., New Delhi

9.   Concepts in Physics by HC Verma; Bharti Bhawan Ltd., New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	4	5
2	8	10
3	10	15
4	12	20
5	6	10
6	12	20
7	12	20
Total	**64**	**100**

PROGRAMMING IN 'C'
(Common with PGDCA and Computer Sc. & Engineering)

L T P
3 - 4

Computers play a vital role in present day life, more so, in the professional life of technician engineers. People working in field/ computer industry use computers in solving problems more easily and effectively. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various applications of computers. The knowledge of C language will be reinforced by the practical exercises.

DETAILED CONTENTS

1.   Algorithm and Programming Development   (06 hrs)

    1.1   Steps in development of a program
    1.2   Flow charts, Algorithm development
    1.3   Program Debugging

2.   Fundamentals of 'C'   (04 hrs)

    2.1   I/o statements, assign statements
    2.2   Constants, variables and data types
    2.3   Operators and Expressions
    2.4   Standards and Formatted
    2.5   Key word, data Types and Identifiers

3.   Control Structures   (08 hrs)

    3.1   Introduction
    3.2   Decision making with IF – statement
    3.3   IF – Else and Nested IF
    3.4   While and do-while, for loop
    3.5   Break and switch statements
    3.6   Switch and go to Statement

4.   Functions   (6 hrs)

    4.1   Introduction to functions
    4.2   Global and Local Variables
    4.3   Function Declaration
    4.4   Standard functions
    4.5   Parameters and Parameter Passing
    4.6   Call – by value/reference

4.7   Recursion

5.   Arrays   (4 hrs)

   5.1   Introduction to Arrays
   5.2   Array Declaration
   5.3   Single and Multidimensional Array
   5.4   Arrays of characters

6.   Pointers   (06 hrs)

   6.1   Introduction to Pointers
   6.2   Address operator and pointers
   6.3   Declaring and Initializing pointers
   6.4   Assignment through pointers
   6.5   Pointers and Arrays

7.   Structures and Unions   (06 hrs)

   7.1   Declaration of structures
   7.2   Accessing structure members
   7.3   Structure Initialization
   7.4   Arrays of structure
   7.5   Unions

8.   Strings   (4 hrs)

   8.1   Introduction
   8.2   Declaring and Initializing string variables
   8.3   Reading and writing strings
   8.4   String handling functions

9.   Files   (4 hrs)

   9.1   Introduction
   9.2   Creating a data file opening and closing a data file, processing a data file

LIST OF PRACTICALS

1.   Programming exercises on executing and editing a C program.
2.   Programming exercises on defining variables and assigning values to variables.
3.   Programming exercises on arithmetic and relational operators.
4.   Programming exercises on arithmetic expressions and their evaluation
5.   Programming exercises on formatting input/output using printif and scarif.
6.   Programming exercises using if statement.
7.   Programming exercises using if – Else.
8.   Programming exercises on switch statement.
9.   Programming exercises on do – while statements.

10.   Programming exercises on for – statement.
11.   Programs on one-dimensional array.
12.   Programs on two-dimensional array.
13.   (i)   Programs for putting two strings together.
        (ii)   Programs for comparing two strings.
14.   Simple programs using structures.
15.   Simple programs using pointers.

INSTRUCTIONAL STRATEGY

The subject is totally practice based. Students should be given clear idea about the basic concepts of programming. In practical session student should be asked to draw flow chart write algorithm and then write program for the algorithm and run on the computer. It is required that students should maintain records (files with printouts).

RECOMMENDED BOOKS

1. Programming in C by Schaum Series, McGraw Hills Publishers, New York Application Programming in C by RS Salaria, Khanna Book Publishing Co(P) Ltd. New Delhi
2. Let us Exploring C by Yashwant Kanetkar – BPB Publications, New Delhi
3. Programming with C Language by C Balaguruswami, Tata McGraw Hill, New Delhi
4. Programming in C by Stefin G. Coachin
5. Programming in C by R Subburaj, Vikas Publishing House Pvt. Ltd., Jangpura, New Delhi
6. Elements of C by M.H. Lewin, Khanna Publishers, New Delhi
7. Programming in C by Stephen G Kochan
8. Programming in C by BP Mahapatra, Khanna Publishers, New Delhi
9. Programming in C by Suresh Srivastava

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted
1	6	10
2	4	10
3	8	15
4	6	15
5	4	10
6	6	15
7.	6	15
8.	4	5
9.	4	5
Total	**48**	**100**

ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING
(Common with Chemistry, Computer Engineering and Information Technology)

L T P
4 - 2

RATIONALE

One of the objectives of the course is to impart basic knowledge and skills regarding basic electrical engineering, which diploma holders will come across in their professional life. This course will provide the students to understand the basic concepts and principles of d.c. and a.c. fundamentals, electromagnetic induction, batteries, transformers, motors, distribution system, domestic installation, electrical safety etc. In addition, this subject also aims at providing the students with knowledge of fundamental concepts of basic electronics and understanding of conductors, semiconductors and insulators, extrinsic and intrinsic semi-conductors, p-n junction, need of rectifiers in electronics, understanding the working of transistors in various configurations and introduction to thyristers.

DETAILED CONTENTS

A.   **ELECTRICAL ENGINEERING**   **(44 hrs)**

1.   Application and Advantage of Electricity   (02 hrs)
     Difference between ac and dc, various applications of electricity, advantages of electrical energy over other types of energy

2.   Basic Electrical Quantities   (02 hrs)
     Definition of voltages, current, power and energy with their units, name of instruments used for measuring above quantities, connection of these instruments in an electric circuit

3.   AC Fundamentals   (08 hrs)
     Electromagnetic induction-Faraday's Laws, Lenz's Law; Fleming's rules, Principles of a.c. Circuits; Alternating emf, Definition of cycle, frequency, amplitude and time period. Instantaneous, average, r.m.s and maximum value of sinusoidal wave. Concept of phase and phase difference. Concept of resistance, inductance and capacitance in simple a.c. circuit. Power factor and improvement of power factor by use of capacitors. Concept of three phase system; star and delta connections; voltage and current relationship (no derivation)

4.   Transformers   (06 hrs)
     Working, principle and construction of single phase transformer, transformer ratio, emf equation, losses and efficiency, cooling of transformers, isolation transformer, CVT, auto transformer (brief idea), applications.

5.   Distribution System   (06 hrs)
     Difference between high and low voltage distribution system, identification of three-phase wires, neutral wire and earth wire in a low voltage distribution system. Identification of voltages between phases and between one phase and neutral. Difference between three-phase and single-phase supply

6.   Electric Motors   (08 hrs)

Description and applications of single-phase and three-phase motors. Connection and starting of three-phase induction motors by star-delta starter. Changing direction of rotation of a given 3 phase induction motor. Motors used for driving pumps, compressors, centrifuge, dyers etc. Totally enclosed, submersible and flame proof motors

7.   Domestic Installation   (06 hrs)
Distinction between light-fan circuit and single phase power circuit, sub-circuits, various accessories and parts of domestic electrical installation. Identification of wiring systems. Common safety measures and earthing

8.   Electrical Safety   (04hrs)
Electrical shock and precautions against shock, treatment of electric shock, concept of fuses and their classification, selection and application, concept of earthing and various types of earthing, applications of MCBs and ELCBs

9.   Batteries   (02 hrs)
Construction, charging and maintenance of lead acid batteries, maintenance free batteries

B.   **BASIC ELECTRONICS**   **(20 hrs)**

10.   Semi conductor physics: (4 hrs)
Review of basic atomic structure and energy levels, concept of insulators, conductors and semi conductors, atomic structure of Germanium (Ge) and Silicon (Si),covalent bonds. Energy level diagram of conductors, insulators and semi conductors; minority and majority carriers.

9.   Semi conductor diode: (4 hrs)
PN junction diode, mechanism of current flow in PN junction, forward and reverse biased PN junction, potential barrier, concept of junction capacitance in forward and reverse bias condition. Diode as half wave, full wave and bridge rectifier. Types of diodes, characteristics and applications of Zenor diodes. Zenor and avalanche breakdown.

10.   Introduction to Bipolar transistor   (6 hrs)
Concept of bipolar transistor, structure, PNP and NPN transistor, their symbols and mechanism of current flow; Current relations in transistor; concept of leakage current; CB, CE, CC configuration of the transistor; Transistors as an amplifier in CE Configurations.

11.   Introduction to SCR   (6 hrs)
Construction and working principles of an SCR, two transistor analogy circuit and characteristics of SCR, Construction and working principles and V-I characteristics of DIAC and TRIAC, Methods of triggering a Thyristor, Applications of SCR and TRIACS such as light intensity control, fan regulator, battery charge etc.

LIST OF PRACTICALS

1.   Use of ammeter, voltmeter, wattmeter, and multi-meter
2.   Connection of a three-phase motor and starter with fuses and reversing of direction of rotation
3.   Connection of a single-phase induction motor with supply and reversing of its direction of rotation

4. Charging and testing of a lead – acid battery
5. Troubleshooting in domestic wiring system, including distribution board
6. Connection and reading of an electric energy meter
7. Study of earthing practices
8. Measurement of power and power factor in a given single phase ac circuit
9. Study of different types of fuses, MCBs and ELCBs
10. To plot V-I characteristics for PN junction diode
11. Study of zener as a constant voltage source and to draw its V-I characteristics
12. To draw V-I characteristics of a (i) NPN transistor (ii) thyristor (SCR)
13. Observe the wave shape of following rectifier circuit (a) Half wave rectifier (b) Full wave rectifier (c) Bridge rectifier
14. Study of construction and working of a Thyristor and its application in controlling light intensity of a lamp.

INSRUCTIONAL STRATEGY:

This being a prerequisite and foundation subject for teacher should give emphasis on understanding of concepts and explanation of various term used in the subject. Practical exercises will reinforce various concepts. Industrial/field exposure must be given by organizing visit(s).

RECOMMENDED BOOKS

1. Basic Electrical Engineering by PS Dhongal; Tata McGraw Hill Publishers, New Delhi
2. A Text Book of Electrical Technology, Vol. I and II by BL Thareja; S Chand and Co., N. Delhi
3. Basic Electricity by BR Sharma; Satya Prakashan, New Delhi
4. Basic Electrical Engineering by JB Gupta, S Kataria and Sons, Delhi
5. Experiments in Basic Electrical Engineering by SK Bhattacharya and KM Rastogi, New Age International Publishers Ltd., New Delhi
6. Electrical Machines by SK Bhattacharya; Tata McGraw Hill, New Delhi
7. Basic Electronics&Linear circuits by NN Bhargava and Kulshreshta, Tata McGraw Hill N. Delhi.
8. Electronic principles by SK Sachdev, Dhanpat Rai and Sons, New Delhi.
9. Electronic Devices and circuits by Rama Raddy Narora Publishing House Pvt. Ltd. New Delhi.
10. Principles of Electrical And Electronics Engineering by VK Mehta; S Chand and Co. New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	2	5
2	2	5
3	8	10
4	6	10
5	6	10
6	8	10
7	6	10
8	4	5
9	2	5
10	4	5
11	4	5
12	6	10
13	6	10
Total	**64**	**100**

ENGINEERING DRAWING – II
(Common with Civil, Electrical and Mechanical Engineering)

L T P
- - 6

RATIONALE

Drawing is said to be the language of engineers and technicians. Reading and interpreting engineering drawing is their day-to-day responsibility. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation

Note: 1.   First angle projection is to be followed
       2.   Minimum of 15 sheets to be prepared by each student
       3.   SP 46 – 1988 should be followed
       4.   Instructions relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students

DETAILED CONTENTS

1.   Development of Surfaces (2 sheets)
     Development of surfaces – cubes, prisms, (square, pentagonal and hexagonal), cylinders, pyramids (square, pentagonal, hexagonal) and cones

2.   Detail and Assembly Drawing (2 sheets)
     2.1   Principle and utility of detail and assembly drawings
     2.2   Wooden joints i.e. corner mortice and tenon joint, Tee halving joint, Mitre faced corner joint, Tee bridle joint, Crossed wooden joint, Cogged joint, Dovetail joint, Through Mortise and Tenon joint

3.   Threads (2 sheets)
     3.1   Nomenclature of threads, types of threads (metric), single and multiple start threads
     3.2   Forms of various external thread sections such as V, square and acme threads, BA, BSW and Knuckle, Metric, Seller Thread, Buttress Threads
     3.3   Simplified conventions of left hand and right hand threads, both external and internal threads

4.   Locking Devices (1 sheet)
     Lock nut, castle nut, split pin nut, sawn nut, slotted nut

5.   Nuts and Bolts (3 sheets)
     Different views of hexagonal and square nuts; Assembly of hexagonal headed, square headed, square headed with square neck, bolts with hexagonal and square nuts and washers. Foundations bolts – Rag bolt and Lewis bolt

6.   Screws, Studs and Washers (1 sheet)
- 6.1   Drawing various types of machine screws
- 6.2   Drawing various types of studs and set screws

7.   Keys and Cotters (2 sheets)
- 7.1   Various types of keys and cotters and their practical application and preparation of drawing of various keys and cotters showing keys and cotters in position
- 7.2   Cotter joints (i) gib and cotter joint (ii) knuckle joint

8.   Rivets and Riveted Joints (2 sheets)
- 8.1   Types of structural and general purposes rivet heads
- 8.2   Caulking and fullering of riveted joints
- 8.3   Types of riveted joints – lap, butt (single riveted, double riveted lap joint, single cover plate and double cover plate), chain and zig – zag riveting

9.   Welded Joints (1 sheet)
- 9.1   Various conventions and symbols of welded joints (IS 696)
- 9.2   Practical applications of welded joints say joints on steel frames, windows, doors and furniture

10.   Couplings (2 sheets)
- 10.1   Muff or Box coupling, half lap muff coupling
- 10.2   Flange coupling (Protected and non-protected)
- 10.3   Flexible coupling

11.   AutoCAD (for practicals and viva only)
- 11.1   Practice on drawing commands, editing commands
- 11.2   Practice on sectioning and hatching
- 11.3   Practice on preparing simple drawings

RECOMMENDED BOOKS

1.   Elementary Engineering Drawing by ND Bhatt, Charotar Publishing House
2.   A Text Book of Engineering Drawing by Surjit Singh, Dhanpat Rai and Co. Delhi
3.   Engineering Drawing by PS Gill, SK Kataria and Sons, New Delhi
4.   Machine Drawing by RB Gupta, Satya Prakashan, New Delhi.

Note:
1.   A minimum of 15 sheets should be prepared by each student
2.   No table is suggested for distribution of marks, instead it is emphasized that the examination paper should contain exercises for evaluation of all necessary skills envisaged in the curriculum.
3.   It is also suggested that a comprehensive viva of each students should be conducted by an external examiner during or just after the examinations to ascertain understanding of the subject e.g. reading and interpreting drawings and development of necessary skills etc.

ECOLOGY AND ENVIRONMENTAL AWARENESS CAMP

A diploma holder must have knowledge of different types of pollution caused due to industries and constructional activities so that he may help in balancing the eco system and controlling pollution by pollution control measures. He should also be aware of environmental laws related to the control of pollution.

This is to be organized at a stretch for 3 to 4 days. Lectures will be delivered on following broad topics. There will be no examination for this subject.

1.   Basics of ecology, eco system and sustainable development

2.   Conservation of land reforms, preservation of species, prevention of advancement of deserts and lowering of water table

3.   Sources of pollution - natural and man made, their effects on living and non-living organisms

4.   Pollution of water - causes, effects of domestic wastes and industrial effluent on living and non-living organisms

5.   Pollution of air-causes and effects of man, animal, vegetation and non-living organisms

6.   Sources of noise pollution and its effects

7.   Solid waste management; classification of refuse material, types, sources and properties of solid wastes, abatement methods

8.   Mining, blasting, deforestation and their effects

9.   Legislation to control environment

10.   Environmental Impact Assessment (EIA), Elements for preparing EIA statements

11.   Current issues in environmental pollution and its control

12.   Role of non-conventional sources of energy in environmental protection