2.1 ENGLISH AND COMMUNICATION SKILLS - II

L	T	P
3	-	2

RATIONALE

The curriculum aims to develop the use of English for three major purposes social interaction, academic achievement and professional use. Listening, speaking, reading, and writing skills can not be thought of as independent skills. They are generally perceived as interdependent where one skill often activates the other skills as well as the paralinguistic skills required for the achievement of effective communication. It is believed that the most effective way to achieve these purposes is through the adoption of a thematic, integrated, content-based approach to teaching and learning.

DETAILED CONTENTS

1. LISTENING

Practical:

- Pre-recorded CDs of famous speeches and dialogues: Comprehension exercises based on the audio
- Note-taking
- Drawing inferences
- Summarizing

Note: Teachers are expected to give necessary demonstrations, instructions and guidelines, while teaching above topics

2. SPEAKING

Practical:

- Voice Modulation: Horizons (pitch, tone, volume, modulation)
- Word stress, rhythm, weak and strong form, pauses, group-sense, falling and rising tones, fluency, pace of delivery, dealing with problem sounds, accent, influence of mother tongue etc.
- Situational Conversation/role-playing with feedback, preferably through video recording
- Telephonic Conversation: Types of calls, agreeing and disagreeing, making and changing appointments, reminding, making complaints and handling complaints, general etiquettes,
- A small formal and informal speech
- Seminar
- Debate

Note: Teachers are expected to give necessary demonstrations, instructions and guidelines, while teaching above topics

3. READING

Theory: (10 hrs.)

- Comprehension, Vocabulary enrichment and grammar exercises based on the following selective readings:

Section-I

- The Portrait of a Lady - Khushwant Singh
- The Lost Child by Mulk Raj Anand
- The Refugees – Pearl S. Buck

Section-II

- Life Sketch of Dr. Abdul Kalam
- Abraham Lincoln's letter to his son's Headmaster

Section-III

- All The World's A Stage – W. Shakespeare
- Say Not, The Struggle Nought Availeth – A.H. Clough
- Pipa's Song – Robert Browning
- A Viewpoint – RP Chaddah

- Comprehension exercises on unseen passages

4. WRITING

Theory: (20 hrs.)

- The Art of Précis Writing
- Correspondence: Business and Official
- Drafting
  - Report Writing: Progress report and Project report
  - Inspection Notes
  - Notices: Lost and found; Obituary; Auction
  - Memos and Circulars
  - Notices, Agenda and Minutes of Meetings
  - Use of internet and E-Mails
  - Press Release
  - Applying for a Job: Resume writing; forwarding letter and follow-up
- Writing Telephonic messages
- Filling-up different forms such as Banks and on-line forms for Placement etc.

Note: Teachers are expected to give practical examples, while teaching above topics

5. VOCABULARY AND GRAMMAR

Theory and Practical exercises on following: (12 hrs.)

- Vocabulary of commonly used words
- Glossary of Administrative Terms (English and Hindi)
- One word substitution
- Idioms and Phrases
- Prefixes and Suffixes
- Punctuation
- Narration
- Forms of verbs: Regular and irregular

6. EMPLOYABLE SKILLS

Theory: (06 hrs.)

Importance of developing employable and soft skills; List and tips for developing of employable skills

Practicals:

- Group discussions
- Presentations, using audio-visual aids (including power-pooint)
- Interview techniques: Telephonic interviews, Group interviews, face to face interviews
- Mannerism and etiquette etc.

RECOMMENDED BOOKS

1. Spoken English (2nd Edition) by V Sasikumar & PV Dhamija; Published by Tata MC Graw Hills, New Delhi.
2. Spoken English by MC Sreevalsan; Published by M/S Vikas Publishing House Pvt. Ltd; New Delhi.
3. Spoken English –A foundation course (Part-I & Part-II) By Kamlesh Sdanand & Susheela Punitha; Published by Orient BlackSwan, Hyderabad
4. Practical Course in English Pronunciation by J Sethi, Kamlesh Sadanand & DV Jindal; Published by PHI Learning Pvt. Ltd; New Delhi.
5. A Practical Course in Spoken English by JK Gangal; Published by PHI Learning Pvt. Ltd; New Delhi.
6. English Grammar, Composition and Usage by NK Aggarwal and FT Wood; Published by Macmillan Publishers India Ltd; New Delhi.
7. Business Correspondence & Report writing (4th Edition) by RC Sharma and Krishna Mohan; Published by Tata MC Graw Hills, New Delhi.
8. Business Communication by Urmila Rani & SM Rai; Published by Himalaya Publishing House, Mumbai.
9. Business Communication Skills by Varinder Kumar, Bodh Raj & NP Manocha; Published by Kalyani Publisher, New Delhi.

10. Professional Communication by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.
11. Business Communication and Personality Development by Bsiwajit Das and Ipseeta Satpathy; Published by Excel Books, Delhi
12. Succeeding Through Communication by Subhash Jagota; Published by Excel Books, Delhi
13. Communication Skills for professionals by Nira Konar; Published by PHI Learning Pvt. Ltd; New Delhi.
14. Developing Communication Skills (2nd Edition) by Krishna Mohan & Meera Banerji; Published by Macmillan Publishers India Ltd; New Delhi.
15. Effective Technical Communication By M .Ashraf Rizwi; Published by Tata MC Graw Hills, New Delhi.
16. Basic Communication Skills for Technology by Andrea J Rutherfoord; Published by Pearson Education, New Delhi
17. English & Communication Skills for students of Science & Engineering by SP Dhanavel; Published by Orient BlackSwan, Hyderabad.
18. Technical Communication- Principles & Practices by Meenakshi Raman & Sangeetha Sharma; Published by Oxford University Press, New Delhi.
19. Technical English by S. Devaki Reddy & Shreesh Chaudhary; Published by Macmillan Publishers India Ltd; New Delhi.
20. Advanced Technical Communication, by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.
21. Communication Skills for Engineer & Scientist by Sangeeta Sharma & Binod Mishra; Published by PHI Learning Pvt. Ltd; New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	-	-
2	-	-
3	10	22
4	20	40
5	12	26
6	06	12
Total	**48**	**100**

2.2 APPLIED MATHEMATICS - II

L	T	P
5	-	-

RATIONALE

Applied mathematics forms the backbone of engineering students. Basic elements of Differential calculus and integral calculus and statistics have been included in this course. This will develop analytical abilities to apply in engineering field and will provide continuing educational base to the students.

DETAILED CONTENTS

1. Algebra (10 hrs)

1.1 Determinants: Elementary properties of determinants up to 3rd order, consistency of equations, Crammer's rule.

1.2 Matrix: Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.

1.3 Application of Matrix in computer programming

2. Differential Calculus (24 hrs)

2.1 Definition of function; Concept of limits.

Four standard limits $\lim_{x \to a} \frac{x^n - a^n}{x - a}$,

$\lim_{x \to 0} \frac{\sin x}{x}$, $\lim_{x \to 0} \frac{a^x - 1}{x}$, $\lim_{x \to 0} (1+x)^{1/x}$

2.2 Differentiation of x^n, sin x, cos x, tan x, e^x, $\log_a x$ (Please take one example of differentiation by definition)

2.3 Differentiation of sum, product and quotient of functions. Differentiation of function of a function.

2.4 Differentiation of trigonometric inverse functions. Logarithmic differentiation. Exponential differentiation, Successive differentiation (excluding nth order).

2.5. Application of differential calculus in::

(a) Rate Measures
(b) Errors and increments
(c) Maxima and minima
(d) Equation of tangent and normal to a curve (for explicit functions only)

3. Integral (26 hrs)

3.1 Integration as inverse operation of differentiation with simple examples.

3.2 Simple integration by substitution, by parts and by partial fractions (for linear factors only)

3.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \sin^n x.\, dx$, $\int_0^{\pi/2} \cos^n x\, dx$, $\int_0^{\pi/2} \sin^m x \cos^n x\, dx$

using formulae without proof (m and n being positive integers only)

3.4 Applications of integration for :

(a) Simple problem on evaluation of area bounded by a curve and axes.

(b) Calculation of volume of a solid formed by revolution of an area about axes. (Simple problems).

(c) To calculate average and root mean square value of a function and

(d) Area by Trapezoidal Rule and Simpson's Rule

4. Statistics and Probability (12 hrs)

4.1 Measures of Central Tendency: Mean, Median, Mode with example of daily life.

4.2. Measures of Dispersion: Mean deviation, Standard deviation

4.3. Probability definition and addition law of probability, theorem and simple numerical problems, General view of normal probability curve (No numericals)

4.4. Explanation of different sampling techniques (No numericals)

5. Differential Equations (08 hrs)

5.1 Solution of first order and first degree differential equation by variable separation method (simple problems)

5.2. Differential equations of homogeneous equation

INSTRUCTIONAL STATREGY

Basic elements of Differential Calculus, Integral Calculus, Co-ordinate geometry and Statistics can be taught in the light of their applications in the field of engineering and technology. By laying more stress on applied part, teachers can also help in providing continuing education base to the students.

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
4. Applied Mathematics, Vol. I & II by SS Sabharwal & Sunita Jain, Eagle Parkashan, Jalandhar
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications
6. Engineering Mathematics by Dass Gupta
7. Engineering Mathematics by C Dass Chawla, Asian Publishers, New Delhi

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
12. Applied Mathematics-II, Archana Sharma, Lords Publications, Jalandhar
13. Advanced Engineering Mathematics by Peter V.O,neil, University of Albama 2007 edition, Cengage Learning India Pvt. Ltd. Patparganl, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	**Time Allotted (Hrs)**	**Marks Allotted (%)**
1	10	15
2	24	28
3	26	32
4	12	17
5	08	08
Total	**80**	**100**

2.3 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 to give an understanding of this world both by observation and prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology

DETAILED CONTENTS

1. Optics (12 hrs)

1.1 Review of basic optics laws: Reflection and Refraction

1.2 Refractive index and magnification, image formation in lenses, lens formulae (thin lens only), power of lens, total internal reflection and their applications

1.3 Simple concepts of interference, diffraction , Polarization and their applications like Commercial equipment, optic glasses and its manufacturing and use of Polarimeter in sugarcane industry and distilleries (No explanation required).

1.4 Simple and compound microscope, astronomical telescope, magnifying power and its calculation (in each case) and their applications

2. Electrostatics (10 hrs)

2.1 Coulombs law, unit charge and electric lines of force

2.2 Electric flux and Gauss's Law, Electric field intensity and electric potential

2.3 Electric field due to point charge, straight charged conductor, plane charged sheet and charged sphere (Inside and outside the sphere)

2.4 Capacitance, types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors, Dielectric and its effect on capacitance, and dielectric break down

2.5 Pollution, different types of pollution and polluting agents, Use of Electronics in reducing Air and Water pollution e.g. precipitation of microbes and moisture reparation from air and gases in industry (small explanation only)

3. DC Circuits (15 hrs)

3.1 Concept of electricity, various applications of electricity

3.2 Current, voltage, resistance, potential difference and e.m.f, power, electrical energy and their units, advantages of electrical energy over other forms of energy and Alternating Current and Direct Current

3.3 Ohm's law and its applications, specific resistance, effect of temperature on resistance, co-efficient of resistance, series and parallel combination of resistors an Resistance, Definitions of Conductance and Super Conducter's

3.4 Kirchhoff's laws, Wheatstone bridge principle and its applications

3.5 Heating effect of current and concept of electric power, energy and their units, related numerical problems and their applications

3.6 Examples of DC Circuits e.g. Various electrical and electronic equipment CRO, T.V., Audio system, Computers (Only examples, no explanations)

4. Electromagnetism (10 hrs)

4.1 Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and their units

4.2 Permeability and susceptibility and their applications. Electromagnetic Induction, Lanz's law and its uses like dynomo, Right hand and left hand rules, Magnetic lines of force due to straight conductor, Solenoid and Circular coil. Force on a current carrying rectangular coil placed in magnetic field and its uses in moving coil galvanometer, electric motor (Concept only). Lorentz force, Force on a current carrying conductor (straight and rectangular)

4.3 Moving coil galvanometer its principle, construction and working.

5. Semiconductor physics (07 hrs)

5.1 Energy bands, intrinsic and extrinsic semiconductors, p-n junction diode and its characteristics

5.2 Diode as rectifier – half wave and full wave rectifier, semiconductor transistor pnp and npn (concept only)

6. Modern Physics (10 hrs)

6.1 Lasers: concept of energy levels, ionizations and excitation potentials; spontaneous and stimulated emission; lasers and its characteristics, population inversion, types of lasers, Helium- Neon and ruby lasers their engineering and medical applications

6.2 Fibre optics: introduction to optical fiber materials, types, light propagation and applications in communication.

LIST OF PRACTICALS (To perform minimum eight experiments)

1. To find the focal length of convex lens by displacement method.
2. To determine the magnifying power of an astronomical telescope
3. To verify ohm's laws by drawing a graph between voltage and current.
4. To verify laws of resistances in series and in parallel connection.
5. To find resistance of galvanometer by half deflection method
6. To measure very low resistance and very high resistance using Wheat Stone bridge
7. To determine the capacity of a parallel plate capacitor by discharging through a voltmeter and also find out the tine constant of the given capacitor.
8. To draw characteristics of a pn junction diode and determine knee and break down voltages
9. To find wave length of He Ne semiconductor LASER.
10. Use of CRO in plotting AC/DC

INSTRUCTIONAL STATREGY

Teacher may use various instructional media like models, charts and graphs while imparting instructions. The field application should be made clear before teaching the basics of waves, sound, light, electrostatics, dc circuits, electromagnetism, and semiconductor physics etc 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
2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
4. Fundamentals of Physics by Resnick, Halliday and Walker, Asian Book Pvt. Ltd., New Delhi
5. Fundamentals of Optics by Francis A. Jenkins & Harvey E White, McGraw Hill International Editions, Physics Series
6. A Text Book of Optics, Subramanian and Brij Lal, S Chand & Co., New Delhi
7. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publishers
8. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
9. Applied Physics I & II by RA Banwait & R Dogra, Eagle Parkashan, Jalandhar
10. Applied Physics Vol II by Jasmer Kaur and Bhupinder Singh, Lords Publications, Jalandhar
11. Basic Electronics and Linear Circuits by NN Bhargava et al Tata Mc Graw Hill Publishers, New Delhi
12. Principles of Electronics by SK Sahdev, Dhanpat Rai and Co, New Delhi
13. Engineering Physics by Vanchna Singh and Sheeetal Kumar, Cengage Learning India Pvt. Ltd. Patparganj, Delhi (year 2008)

Suggested Distribution of Marks for Facilitating Paper Setter

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Optics	12	20
2	Electrostatics	10	15
3	DC Circuits	15	20
4	Electromagnetism	10	20
5	Semiconductor Physics	07	10
6	Modern Physics	10	15
	Total	**64**	**100**

2.4 BASIC ELECTRICAL ENGINEERING

[Common in ECE, I&C, Eltx. (Microprocessor) Computer Engg. & IT]

L	T	P
4	-	2

RATIONALE

A diploma holder may be involved in various jobs ranging from preventive maintenance of electrical installation to fault location. In addition, he/she may be working in testing laboratories where he/she uses measuring instruments. To carry out these and similar jobs effectively, knowledge of basic concepts, principles and their applications is very essential. This course will enable the students to understand the basic concepts and principles of dc and ac fundamental, ac circuits, batteries, electromagnetic induction, voltage and current sources etc

DETAILED CONTENTS

1. Overview of DC Circuits (06 hrs)

   1.1 Simple problems on series and parallel combination of resistors with their wattage consideration,

   1.2 Application of Kirchhoff's current law and Kirchhoff's voltage law to simple circuits. Star – Delta connections and their conversion.

2. DC Circuit Theorems (06 hrs)

   Thevenin's theorem, Norton's theorem, application of network theorems in solving d.c circuit problems.

3. Voltage and Current Sources (04 hrs)

   a) Concept of voltage source, symbol and graphical representation characteristics of ideal and practical sources.

   b) Concept of current sources, symbol, characteristics and graphical representation of ideal and practical current sources.

4. Electro Magnetic Induction (10 hrs)

   a) Concept of electro-magnetic field produced by flow of electric current, magnetic circuit, concept of magneto-motive force (MMF), flux, reluctance, permeability, analogy between electric and magnetic circuit.

   b) Faraday's laws of electro-magnetic induction, principles of self and mutual induction, self and mutually induced e.m.f, simple numerical problems.

   c) Concept of current growth, decay and time constant in an inductive (RL) circuit.

   d) Energy stored in an inductor, series and parallel combination of inductors.

5. Batteries (06 hrs)

5.1 Basic idea of primary and secondary cells
5.2 Construction, working principle and applications of Lead-Acid, Nickel-Cadmium and Silver-Oxide batteries
5.3 Charging methods used for lead-acid battery (accumulator)
5.4 Care and maintenance of lead-acid battery
5.5 Series and parallel connections of batteries
5.6 General idea of solar cells, solar panels and their applications
5.7 Introduction to maintenance free batteries

6. AC Fundamentals (10 hrs)

6.1 Concept of alternating quantities
6.2 Difference between ac and dc
6.3 Concepts of: cycle, frequency, time period, amplitude, instantaneous value, average value, r.m.s. value, maximum value, form factor and peak factor.
6.4 Representation of sinusoidal quantities by phasor diagrams.
6.5 Equation of sinusoidal wave form for an alternating quantity and its derivation
6.6 Effect of alternating voltage applied to a pure resistance, pure inductance and pure capacitance.

7. AC Circuits (16 hrs)

7.1 Concept of inductive and capacitive reactance
7.2 Alternating voltage applied to resistance and inductance in series.
7.3 Alternating voltage applied to resistance and capacitance in series.
7.4 Impedance triangle and phase angle
7.5 Solutions and phasor diagrams for simple RLC circuits (series and parallel).
7.6 Introduction to series and parallel resonance and its conditions
7.7 Power in pure resistance, inductance and capacitance, power in combined RLC circuits. Power factor, active and reactive power and their significance, definition and significance of power factor.
7.8 j-notation and its application in solving series and parallel ac circuits
7.9 Definition of conductance, susceptance, admittance, impedance and their units

8. Various Types of Power Plants (06 hrs)

8.1 Brief explanation of principle of power generation practices in thermal, hydro and nuclear power stations and their comparative study. A Visit to a nearby Power Station(s) may be organized for better understanding and exposure.
8.2 Elementary block diagram of above mentioned power stations

LIST OF PRACTICALS

1. Familiarization of measuring instruments viz voltmeter, ammeter, CRO, Wattmeter, multi-meter and other accessories

2. Determination of voltage-current relationship in a dc circuit under specific physical conditions and to draw conclusions.
3. Measurement of resistance of an ammeter and a voltmeter
4. Verification of dc circuits:
   a.. Thevenin's theorem,
   b. Norton's theorem,
5. Observation of change in resistance of a bulb in hot and cold conditions, using voltmeter and ammeter.
6. Verification of Kirchhoff's Current and Voltage Laws in a dc circuit
7. To find the ratio of inductance of a coil having air-core and iron-core respectively and to observe the effect of introduction of a magnetic core on coil inductance
8. Computation of the voltage current relationship in single phase R-L and R-C series circuits, drawing of their impedance triangles and determination of the power factor in each case .
9. Charging and testing of a lead - acid storage battery.
10. Measurement of power and power factor in a single phase R-.L-.C. Circuit and calculation of active and reactive powers in the circuit.
11. Visit to a nearby Power Station(s) may be arranged

INSTRUCTIONAL STRATEGIES

Basic electrical engineering being a fundamental subject, it needs to be handled very carefully and in a manner such that students develop clear understanding of the related concepts and principles. The teacher may lay more emphasis on laboratory work and give home assignments to students to inculcate self-study and problem solving abilities amongst them.

RECOMMENDED BOOKS

1. Electrical Technology, Fifth Edition by Edward Hughes, Longman Publishers.
2. Basic Electrical and Electronics Engineering by SK Sahdev; Dhanpat Rai and Co, New Delhi.
3. Experiments in Basic Electrical Engineering by SK Bhattacharya, KM Rastogi; New Age International (P) Ltd.; Publishers New Delhi.
4. Electrical Science by Choudhury S.; Narosa Publishing House Pvt Ltd, Darya ganj, New Delhi.
5. Basic Electrical and Electronics Engineering by Kumar KM, Vikas Publishing House Pvt Ltd, Jang pura, New Delhi.
6. Electrical Technology by BL Theraja, S Chand and Co, New Delhi.
7. Basic Electricity by BR Sharma; Satya Prakashan; New Delhi.
8. Principles of Electrical Engineering by BR Gupta, S Chand and Co, New Delhi.
9. Basic Electrical Engineering by PS Dhogal, Tata Mc Graw-Hill publishing Company Ltd., New Delhi.
10. Basic Electrical Engineering by JB Gupta; SK Kataria and Sons, New Delhi.
11. Experiments in Basic Electrical Engineering by GP Chhalhotra, Khanna Publishers, New Delhi
12. Basic Electrical Engineering by J.S. Katre, Technical Max. Publication, Pune.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1.	Overview of DC Circuits	06	8
2.	DC Circuit Theorems	06	10
3.	Voltage and Current Sources	04	08
4.	Electro Magnetic Induction	10	15
5.	Batteries	06	12
6.	AC Fundamentals	10	15
7.	AC Circuits	16	20
8	Various Types of Power Plants	06	12
	Total	**64**	**100**

2.5 BASIC ELECTRONICS

[Common in ECE, I&C, Eltx. (Microprocessor) Computer Engg. & IT]

L	P
4	2

RATIONALE

This subject gives the knowledge of fundamental concepts and principles of basic electronics and aims at providing the students with basic understanding of various types of materials such as conductors, semiconductors and insulators, extrinsic and intrinsic semi-conductors, p-n junction, need of rectifiers, significance and use of filters in rectifiers, basic structure and working principle of tunnel diodes, LEDs, varactor diodes, LCD; working of transistors in various configurations; fundamental knowledge of FETs and MOSFETs etc. and their applications. The teacher should give emphasis on understanding of concepts by explaining the various terms used in the subject. Practical exercises have been included in order to reinforce various concepts. Industrial/field exposure must be given by organizing industrial visit.

DETAILED CONTENTS

1. Semi conductor physics: (12 hrs)

    1.1 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
    1.2 Concept of intrinsic and extrinsic semi conductor, process of doping.
    1.3 Energy level diagram of conductors, insulators and semi conductors; minority and majority charge carriers.
    1.4 P and N type semiconductors and their conductivity, effect of temperature on conductivity of intrinsic semi conductors.

2. Semi conductor diode: (12 hrs)

    2.1 PN junction diode, mechanism of current flow in PN junction, forward and reverse biased PN junction, potential barrier, drift and diffusion currents, depletion layer, concept of junction capacitance in forward and reverse biased condition.
    2.2 V-I characteristics, static and dynamic resistance and their value calculation from the characteristics.
    2.3 Application of diode as half-wave, full wave and bridge rectifiers. PIV, rectification efficiencies and ripple factor calculations, shunt capacitor filter, series inductor filter, LC and RC filters.
    2.4 Types of diodes, characteristics and applications of Zener diodes. Zener and avalanche breakdown.

3. Introduction to Bipolar-transistors: (12 hrs)

    3.1 Concept of a bipolar transistor, its structure, PNP and NPN transistors, their symbols and mechanism of current flow; Current relations in a transistor; concept of leakage current;
    3.2 CB, CE, CC configurations of a transistor; Input and output characteristics in CB and CE configurations; input and output dynamic resistance in CB and CE configurations; Current amplification factors. Comparison of CB, CE and CC Configurations;

3.4 Transistor as an amplifier in CE Configuration; concept of dc load line and calculation of current gain and voltage gain using dc load line.

4. Transistor biasing Circuits: (06 hrs)

Concept of transistor biasing and selection of operating point. Need for stabilization of operating point. Different types of biasing circuits.

5. Single stage transistor amplifier: (10 hrs)

Single stage transistor amplifier circuit, ac load line and its use in calculation of current and voltage gain of a single stage amplifier circuit. Explanation of phase reversal of output voltage with respect to input voltage. H-parameters and their significance.

6. Field effect Transistors (12 hrs)

Construction, operation and characteristics of FETs and their applications.

6.1 Construction, operation and characteristics of a MOSFET in depletion and enhancement modes and its applications.

6.2 C MOS - advantages and applications

6.3 Comparison of JFET, MOSFET and BJT.

6.4 FET amplifier circuit and its working principle. (Excluding Analysis).

LIST OF PRACTICALS

1. Familiarization with operation and use of the following instruments.
Multi-meter, CRO, Signal generator, LCR meter, Regulated Power Supply by way of taking readings of relevant quantities with their help.

2. Plotting of V-I characteristics of a PN junction diode

3. Plotting of V-I characteristics of a Zener diode

4. Measurement of the voltage gain, input and output impedance in a single state CE amplifier circuit.

5. Fabrication of:

   a. Half-wave rectifier circuit using one diode
   b. Full-wave rectifier circuit using two diodes
   c. Bridge-rectifier circuit using four diodes

6. Observation of the wave shapes for the following rectifier circuit
   d. Half-wave rectifier
   e. Full-wave rectifier
   f. Bridge-rectifier

7. Plotting of the wave shape of full wave rectifier with
   a. Shunt capacitor filter
   b. Series inductor filter
   c. RC filter

8. Plotting of input and output characteristics and calculation of parameters of transistors in CE configuration.

9. Plotting of input and output characteristics and calculation of parameters of transistors in CB configuration.

10. Plotting of V-I characteristics of a FET based amplifier.

11. Measurement of the Q-point and observation of variation of Q-point by:

.

   a. By increasing the base resistance in fixed bias circuit.
   b. By changing out of bias resistance in potential divider circuit.

12. Measurement of voltage gain, input and output impedance in a single state CE amplifier circuit.

INSTRUCTIONAL STRATEGY

The aim of this subject is to provide the knowledge of the fundamental concepts related to basic electronics. The teacher should give more emphasis on understanding of concepts and the measuring of various terms used in the subject. The students be made familiar with diodes, transistors, resistors, capacitors, inductors etc. and various measuring instruments such as Multi-meter, CRO, Signal generator, LCR meter, Regulated Power Supply etc. Practical exercises should be included to reinforce the various concepts. Practical applications of semiconductor diodes, transistors, field effect transistors etc must be elucidated to the students.

RECOMMENDED BOOKS

1. Basic Electronics and Linear Circuit by NN Bhargava, Kulshreshta and SC Gupta, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi.
2. Principles of Electrical and Electronics Engineering by VK Mehta; S Chand and Co., New Delhi
3. Electronic Components and Materials by SM Dhir, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi.
4. Electronics Devices and Circuits by Millman and Halkias; McGraw Hill.
5. Principles of Electronics by Albert Paul Malvino; Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi.
6. Basic Electronics by J.S. Katre, Sandeep Bajaj, Tech. Max. Publications, Pune.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Semi Conductor Physics	12	20
2	Semi Conductor Diode	12	20
3	Introduction To Bipolar-Transistors	12	20
4	Transistor Biasing Circuits	6	5
5	Single Stage Transistor Amplifier	10	15
6	Field Effect Transistors	12	20
	Total	**64**	**100**

2.6 WORKSHOP PRACTICE - II

L	T	P
-	-	6

RATIONALE

In order to have a balanced overall development of diploma engineers, it is necessary to integrate theory with practice. General workshop practices are included in the curriculum in order to provide hand on experience about use of different tools and basic manufacturing practices.

This course aims at developing general manual and machining skills in the students. Besides above, the development of dignity of labour, precision, safety at work place, team working and development of right attitude are the other objectives.

DETAILED CONTENTS (PRACTICALS)

The following shops are included in the syllabus:

1. Welding Shop
2. Electronic Shop
3. Sheet Metal Shop

Note:

The contents of various shops prescribed under workshop Practice –I are same as that of General Workshop Practice-I which is common for most of engineering diploma programmes except for Computer Engineering and Information Technology.

The instructor is to first explain the introductory part given at the beginning under each shop followed by demonstration and practice by students.

1. Welding Shop

1.1 Introduction to welding and its importance in engineering practice; types of welding; common materials that 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 and accessories.

1.2 Electric arc welding, (ac. and dc.) precautions while using electric arc welding, Practice in setting current and voltage for striking proper arc.

Job I Practice of striking arc while using electric arc welding set.

Job II Welding practice on electric arc welding for making uniform and Straight weld beads

1.3 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.

2. Electronic Shop

2.1 Identification and familiarization with the following tools used in electronic shop:

Tweezers, Screw drivers (different sizes), Insulated Pliers, Cutter, Sniper, Philips Screw Driver (Star Screw Driver), L- Keys, Soldering Iron and their demonstration and uses.

2.2 Identification and familiarization with the following electronic instruments:

a) Multimeter analog and digital (Three and half digit)

b) Single beam simple CRO, Signal Generator and Function Generator; function of every knob on the front panel

c) Audio-oscillator having sine and square wave output

d) Regulated Power supply -- fixed voltage and variable voltage, single output as well as dual output.

Job I Practice in the use of above-mentioned equipment. For this small experimental as set up may be done

2.3 Various types of protective devices such as : Wire fuse, cartridge fuse etc.

2.4 Identification and familiarization with ear phone speaker connector, telephone jacks and similar male and female connectors

2.5 Safety precautions to be observed in the electronic shop

NOTE: Demonstration Boards for the above components should be made.

Job II Cut, strip, join and insulate two lengths of wires/ cables (repeat with different types of cables/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, terminal strips, connectors. The tasks should include making complete recording/ playback/ antenna/ speaker leads for common electronic products such as Radio, TV, CD Players, VCD/DVD Players, Cassette Recorder and Players, Hi-Fi equipment, Hand- set, microphone

Job IV Cut, bend, tin component, Leeds, inserts and solder components (resistor, capacitor, diodes, transistors, FETs, IFT coils, ICs etc) on a PCB

3. 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.

3.1 Introduction and demonstration of hand tools used in sheet metal shop.

3.2 Introduction and demonstration of various machines and equipment used in sheet metal shop e.g. Shearing Machine, Bar Folder, Burring Machine, Turning Machine, Wiring Machine, Setting Down Machine, Forming Machine , Brake etc.

3.3 Introduction and demonstration of various raw materials used in sheet metal shop e.g. black-plain sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheets etc.

3.4 Study of various types of Nuts, Bolts, Rivets, Steel Screws 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, zig-zag type and single rivetted Butt Joint

RECOMMENDED BOOKS

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary. Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd. New Delhi
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
5. Workshop Technoogy by B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi
6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi

2.7 DESK TOP PUBLISHING (DTP) FUNDAMENTALS

(Common in Computer Engineering and Information Technology)

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RATIONALE

This course will enable the students to familiarize with the features and use of application packages such as Page Maker, Corel Draw or any other equivalent latest package(s). They will develop skills in handling the software.

Note: Since this is a practical oriented subject, there will be no theory paper. It is suggested that the teacher should explain the following topics during the practical classes itself.

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Introduction
   Overview of Desk Top Publishing (DTP), Introduction of various keys in the keyboard and their functions.

2. Page Maker
   Document needs, creating a document, editing and formatting a document, saving and printing a document, inserting text and graphics, inserting columns, fonts and styles, integrating images and graphics from a drawing package in the document, making transparencies, elements, frame option, arrange text, image control, expert tracking, indent/tabs, styles, type styles, layout, tool bar (page setting)

3. Corel Draw
   3.1 Introduction, exploring Corel Draw screen, using dialog boxes, using roll ups, create/open file, save file, import/export files, print file

   - Use of ribbon bar, use of tool box, select object, shaping objects using zoom tool, filling objects, outline objects, use of line tool
   - Setting up new drawing, setting multi-page document, undo/redo mistakes, repeat, cut, copy, paste, delete, duplicate, clone
   - Insert object, paste special, copy attributes from select all, drawing objects, selecting objects
   - Page setup, insert/delete page, use of layers, roll up, grid and scale set up, guideline set up

   3.2 Formatting objects
   - Arranging objects: align, order, group, ungroup
   - Arranging objects: combine, break apart, weld, intersection, trim, separate
   - Mode edit: to line, to curve, stretch, rotate, align, convert to curves

- Creating special effects: Transform roll up, clear transformation, add perspective, envelope roll up
- Creating special effects: blend roll-up, extrude roll up, counter roll up, power line, power-clip clear effects
- Working with text: Character, paragraph text, frame, setting of tabs, indents, bullets, spacing in paragraph text

LIST OF PRACTICALS

1. Using windows explorer and other windows elements
2. Creating and opening a document in page maker
3. Formatting and editing a document
4. Saving and printing a given document
5. Insertion of text and graphics in a given document from external source
6. Using columns utility, to give the document column look
7. Using various fonts and styles to make a document more beautiful
8. Use of page maker to make transparencies
9. Saving and printing a file that has been created
10. Formatting a given file by using undo/redo, repeat, cut, copy, paste, delete, duplicate and clone utilities
11. Inserting objects in the drawing, aligning, ordering, grouping and ungrouping of those objects
12. Use of combine, break apart, weld, intersection, trim and separate tools in a given drawing
13. Use of mode edit tools i.e. to line, to curve, to stretch, and rotate
14. Creating special effects i.e. transform roll-up, envelop roll up, add perspective, extrude roll up, contour roll up, power line, power clip, clear effects
15. To insert character and paragraph text in a drawing and frame, setting of tabs, indents, bullets and spacing in paragraph text
16. Filling of text to a given path, aligning it to base line, straighten text and edit text
17. Using tools such as spell checker, and thesaurus
18. Using find and replace text utility and type assist
19. Adding various symbols to a drawing and creating different pattern

INSTRUCTIONAL STRATEGIES

This subject is completely practical oriented. Stress is to be given to impart hands on experience to the students. With this subject, the students will be able to create, edit, format and print a document with the help of page maker, corel-draw etc.

RECOMMENDED BOOKS

1. Desk Top Publishing From A to Z by Bill Grout and Osborne; McGraw Hill

2. DTP (Desk Top Publishing) for PC user by Houghton; Galgotia Publishing House Pvt. Ltd., Daryaganj, New Delhi

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