

1.1 ENGLISH AND COMMUNICATION SKILLS - I

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 subject is to enable the diploma holders to acquire proficiency, both in spoken (oral) and written language. At the end of the subject, 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 Homecoming – R.N. Tagore
- 1.1.2 The Selfish Giant - Oscar Wilde
- 1.1.3 The Diamond Necklace- Guy- De Maupassant

1.2 Prose

- 1.2.1 I Have A Dream – Martin Luther King
- 1.2.2 On Habits – A. G. Gardiner
- 1.2.3 My struggle for An Education- Booker T Washington

1.3 Poems

- 1.3.1 Ozymandias – P.B. Shelley
- 1.3.2 Daffodils – William Wordsworth
- 1.3.3 Stopping by Woods on a Snowy Evening – Robert Frost

2. Grammar and Usage (10 hrs)

2.1 Parts of speech

- 2.1.1 Nouns
- 2.1.2 Pronouns
- 2.1.3 Adjectives
- 2.1.4 Articles
- 2.1.5 Verbs
- 2.1.6 Adverbs

- 2.1.7 Prepositions
- 2.1.8 Conjunction
- 2.1.9 Interjection
- 2.1.10 Identifying parts of speech
- 2.1.11 Using a word as different parts of speech
- 2.2 Pair of words (Words commonly confused and misused)
- 2.3 Tenses
- 2.4 Correction of incorrect sentences
- 2.5 One word substitution
- 2.6. Forms of verbs (100 words)
- 3. Translation (04 hrs)
 - 3.1 Glossary of Administrative Terms (English/ Hindi/Urdu)
 - 3.2 Translation from Urdu into English
- 4. Paragraph of 100-150 words from outlines (08 hrs)
- 5. Comprehension (04 hrs)

Unseen passages of literature, scientific data/graph based for comprehension exercises
- 6. Communication (08 hrs)
 - 6.1 Definition, Introduction and Process of Communication
 - 6.2 Objectives of Communication
 - 6.3 Essentials of Communication

LIST OF PRACTICALS

1. Locating a Book in Library
2. To look up words in a Dictionary: meaning and pronunciation of words as given in the standard dictionary using symbols of phonetics
3. To seek information from an Encyclopedia
4. Listening pre-recorded English language learning programme
5. Paper reading before an audience (reading unseen passages)
6. Study of spelling Rules
7. Study of essentials of a good speech to respond and comprehend visual, oral themes, situations or stimulus and practice before select gathering (Making an oral presentation with stress on body language and voice modulation)
8. Exercises on use of different abbreviations
9. Greetings for different occasions
10. Introducing oneself, others and leave taking

11. Exercises on writing sentences on a topic

Note:

1. The Text Book on “English and Communication Skills, Book-I By Kuldip Jaidka et. al. developed by NITTTR, Chandigarh is recommended to be used for teaching and 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 the practicals
4. The practical exercises involving writing may also be included in Theory Examination.

INSTRUCTIONAL STATREGY

Looking into the present day needs of effective communication in every field, it is imperative to develop necessary competencies in students by giving practical tips and emphasis on grammar, vocabulary and its usage in addition to practical exercises. The teacher should give report writing assignments, projects etc. while teaching this subject.

RECOMMENDED BOOKS

1. English and Communication Skills, Book-I By Kuldip Jaidka, Alwinder Dhillon and Parmod Kumar Singla, Prescribed by NITTTR, Chandigarh Published By Abhishek Publication, 57-59, Sector-17, Chandigarh
2. Rich Vocabulary Made Easy by Kuldip Jaidka , Mohindra Capital Publishers, Chandigarh
3. Spoken English (2nd Edition) by V Sasikumar & PV Dhamija; Published by Tata MC Graw Hills, New Delhi.
4. Spoken English by MC Sreevalsan; Published by M/S Vikas Publishing House Pvt. Ltd; New Delhi.
5. Spoken English –A foundation course (Part-I & Part-II) By Kamlesh Sdanand & Susheela Punitha; Published by Orient BlackSwan, Hyderabad
6. Practical Course in English Pronunciation by J Sethi, Kamlesh Sadanand & DV Jindal; Published by PHI Learning Pvt. Ltd; New Delhi.
7. A Practical Course in Spoken English by JK Gangal; Published by PHI Learning Pvt. Ltd; New Delhi.
8. English Grammar, Composition and Usage by NK Aggarwal and FT Wood; Published by Macmillan Publishers India Ltd; New Delhi.
9. Business Correspondence & Report writing (4th Edition) by RC Sharma and Krishna Mohan; Published by Tata MC Graw Hills, New Delhi.
10. Business Communication by Urmila Rani & SM Rai; Published by Himalaya Publishing House, Mumbai.
11. Business Communication Skills by Varinder Kumar, Bodh Raj & NP Manocha; Published by Kalyani Publisher, New Delhi.

12. Professional Communication by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.
13. Business Communication and Personality Development by Bsiwajit Das and Ipseeta Satpathy; Published by Excel Books, Delhi
14. Succeeding Through Communication by Subhash Jagota; Published by Excel Books, Delhi
15. Communication Skills for professionals by Nira Konar; Published by PHI Learning Pvt. Ltd; New Delhi.
16. Developing Communication Skills (2nd Edition) by Krishna Mohan & Meera Banerji; Published by Macmillan Publishers India Ltd; New Delhi.
17. Effective Technical Communication By M .Ashraf Rizwi; Published by Tata MC Graw Hills, New Delhi.
18. Basic Communication Skills for Technology by Andrea J Rutherford; Published by Pearson Education, New Delhi
19. English & Communication Skills for students of Science & Engineering by SP Dhanavel; Published by Orient BlackSwan, Hyderabad.
20. Technical Communication- Principles & Practices by Meenakshi Raman & Sangeetha Sharma; Published by Oxford University Press, New Delhi.
21. Technical English by S. Devaki Reddy & Shreesh Chaudhary; Published by Macmillan Publishers India Ltd; New Delhi.
22. Advanced Technical Communication, by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.
23. 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	14	30
2	10	20
3	4	10
4	8	15
5	4	10
6	8	15
Total	48	100

GLOSSARY OF ADMINISTRATIVE TERMS

1. Senior	वरिष्ठ	۱۔ بڑا۔ اکبر
2. Cashier	खजांची	۲۔ نقدانچی
3. Consent	सहमती	۳۔ آمادگی۔ رضا مندی
4. Earned Leave	जमा छुट्टी	۴۔ جمع تعطیل۔ جمع چھٹی
5. Under Consideration	विचार अधीन	۵۔ زیر غور
6. Criterion	कसौटी	۶۔ کسوٹی۔ معیار
7. Staff	कर्मचारी	۷۔ ملازم
8. Tenure	कार्यकाल	۸۔ ملازمت کی مدت
9. Working Committee	कार्य समिति	۹۔ کام کرنے والی جماعت
10. Estate	सम्पदा	۱۰۔ جائیداد
11. Self-Sufficient	आत्मनिर्भर	۱۱۔ خود کفیل
12. Emergency	आपातकाल	۱۲۔ ہنگامی صورت حال
13. General Body	आमसभा	۱۳۔ جنرل اجلاس
14. Exemption	छूट	۱۴۔ برعایت
15. Daily wage	दिहाड़ीदार	۱۵۔ یومیہ اجرت پر کام کرنے والا مزدور
16. Death-Cum Retirement	मृत्यु और सेवानिवृत्ति	۱۶۔ موت اور نوکری سے فارغ
17. Despatch Register	रवानगी रजिस्टर	۱۷۔ ڈاک بھیجنے کا رجسٹر
18. Despatch	रवानगी	۱۸۔ روانگی
19. Stenography	आशुलिपिक	۱۹۔ سٹیوگرافی
20. Assurance	दिलासा	۲۰۔ بھروسہ
21. Justify	सही साबित करना	۲۱۔ ثابت کرنا
22. Superior	बढ़िया	۲۲۔ بہتر
23. High Commision	उच्चायुक्त	۲۳۔ ہائی کمیشن
24. Simultaneous	साथ-साथ	۲۴۔ ایک ساتھ
25. Precautionary	सावधानी हेतु, एहतिहाति	۲۵۔ احتیاطاً۔ حفاظتی طور پر
26. Commanding Officer	कमांडिंग अफसर	۲۶۔ کمانڈنگ آفیسر۔ حکم دینے والا افسر
27. Negligence	लापरवाही	۲۷۔ لا پرواہی
28. Performance	पूरा करना	۲۸۔ کارکردگی
29. Proof Reader	प्रूफ रीडर	۲۹۔ موازنہ کرنے والا۔ پروف ریڈر
30. Take Over	काम सभालना	۳۰۔ کام سنبھالنا
31. Timely Compliance	समय दौरान पूरा करना	۳۱۔ بروقت منحل کرنا۔

32. Responsibility	جिम्मेदاری	۳۲ - ذمے داری
33. Chief Justice	मुख्य न्यायधीश	۳۳ - منصف اعلیٰ
34. Disciplinary Action	अनुशासनिक कारवाई	۳۴ - ضابطہ عمل
35. Efficiency Bar	दक्षता रोक	۳۵ - ذخیرہ رک
36. Flying Squad	उड़न दस्ता	۳۶ - چھاپہ مار دستہ
37. Regret	खेद	۳۷ - افسوس - رنج - دکھ
38. Inconvenience	असुविधा	۳۸ - احتیاط
39. Ambiguous	अस्पष्ट	۳۹ - مبہم
40. Part Time	अंशकालीन	۴۰ - مختصر عرصہ کے لئے
41. Academy	अकादमी	۴۱ - مدرسہ
42. Disparity	असमानता	۴۲ - نابرابری
43. Extraordinary	असाधारण	۴۳ - عظیم - نایاب - مخصوص - علیحدہ
44. Provisional	अस्थाई	۴۴ - عارضی
45. Income Tax	आयकर	۴۵ - جزیہ حقیقی
46. Bonafide	असली	۴۶ - سچائی
47. Acting in Official Capacity	बतौर अधिकारिक हैसियत	۴۷ - سرکاری حیثیت سے
48. Contractor	ठेकेदार	۴۸ - یکمشت اجرت سے کام کرنا - محکمہ دار
49. On probation	परिवीक्षाधीन	۴۹ - امتحان پر - پربیشن پر - زیرنگرانی - ٹیسٹ کے طور پر
50. State	राज्य	۵۰ - صوبہ - راجیہ - پرانت
51. Administrator	प्रशासक	۵۱ - منصب دار
52. Admission	प्रवेश	۵۲ - داخلہ
53. Aforesaid	पूर्वोक्त	۵۳ - متذکرہ بالا
54. Affidavit	शपथपत्र	۵۴ - حلف نامہ
55. Agenda	कार्यसूची	۵۵ - کاروباری فہرست
56. Alma Mater	विद्यालय जहां किसी व्यक्ति ने शिक्षा प्राप्त की हो	۵۶ - درس گاہ
57. Appointing Authority	नियुक्ति अधिकारी, मनोनीत अधिकारी	۵۷ - نوکری دینے والا آفیسر
58. Apprentice	शिल्पकार, अप्रेंटिस	۵۸ - نرپر تربیت
59. Additional	अतिरिक्त	۵۹ - زائد
60. Advertisement	विज्ञापन	۶۰ - اشتہار
61. Assistant	सहायक	۶۱ - مددگار
62. Assumption of Charge	अधिकार ग्रहण करना	۶۲ - باز یا فستگی یار
63. Attested copy	सत्यापित प्रति	۶۳ - تصدیق شدہ نقل
64. Chief Minister	मुख्यमन्त्री	۶۴ - وزیر اعلیٰ
65. Clerical Error	लेखन सम्बन्धी त्रुटि	۶۵ - سپروا غلطی
66. Code	कानून की किताब, गुप्त भाषा	۶۶ - قانونی کتاب - پوشیدہ اشارہ

67.	Corruption	भ्रष्टाचार, खोटापन	بے ایمانی - ۶۷
68.	Craftsman	कारीगर	کارگر - ۶۸
69.	Compensation	हरजाना, क्षतिपूर्ति	معاوضہ - ۶۹
70.	Compensatory Allowance	क्षतिपूरक भत्ता	نقصان کو پورا کرنے والا حصہ - ۷۰
71.	Compile	संकलन करना, संग्रह करना	سنگرہ کرنا - اکٹھا کرنا - ۷۱
72.	Confidential Letter	गुप्त पत्र	تحفیہ خط (دستاویز) - ۷۲
73.	Chief Engineer	मुख्य अभियन्ता	چیف انجینئر - اعلیٰ انجینئر - ۷۳
74.	Data	स्वीकृत तत्व (आंकड़े)	اعداد و شمار - ۷۴
75.	Dearness Allowance	मंहगाई भत्ता	مہنگائی حصہ - ۷۵
76.	Department	विभाग	محکمہ - ۷۶
77.	Dictionary	शब्द कोष	لغات - ۷۷
78.	Director	निर्देशक, संचालक	ڈائریکٹر - ۷۸
79.	Director of Tech. Edu.	तकनीकी शिक्षा निर्देशक	ڈائریکٹر تکنیکی تعلیم - ۷۹
80.	Executive Engineer	अधिकासी अभियन्ता	انتظامیہ انجینئر - ۸۰
81.	Employment Exchange	रोजगार केंद्र, व्यवसाय	روزگار دفتر - ۸۱
82.	Head Office	मुख्य कार्यालय	صدر دفتر - ۸۲
83.	Head Clerk	प्रधान लिपिक	ہیڈ کلرک - پربان کلرک - ۸۳
84.	Indian Admn. Service	भारतीय प्रशासनिक सेवा	ہندوستان انتظامیہ سروس - ۸۴
85.	Legislative Assembly	विधान सभा	صوبائی کونسل - ۸۵
86.	Officiating	स्थानापन्न	عارضی - قائم مقام - ۸۶
87.	Office Record	कार्यालय रिकार्ड	دفتری ریکارڈ - ۸۷
88.	Office Discipline	कार्यालय अनुशासन	دفتری ضابطہ - ۸۸
89.	Polytechnic	बहुतकनीकी	تکنیکی - دستکاری - ۸۹
90.	Temporary	अस्थायी	عارضی - ۹۰
91.	Qualified	योग्यता प्राप्त	تربیت یافتہ - ۹۱
92.	Under-Investigation	जांच अधीन	زیر تفتیش - ۹۲
93.	Sub-treasury	उप-खजाना	سب ٹریزری - ۹۳
94.	Target Date	लक्ष्य तिथि	مقررہ تاریخ - ۹۴
95.	Technical Approval	तकनीकी मान्यता	تکنیکی منظوری - ۹۵
96.	Verification	जांच पड़ताल	تصدیق - ۹۶
97.	Viva-Voce	मौखिक परीक्षा	زبانی امتحان - ۹۷
98.	Write off	बटटेखाते डालना	وہ رقم / سامان جو وصول نہ ہو سکے - ناقابل وصول کھا - ۹۸
99.	Warning	चेतावनी	واہتنگ / اطلاع - پتیا دنی - ۹۹
100.	Yours faithfully	भवदीय	خیر اندیش - ۱۰۰

1.2 APPLIED MATHEMATICS - I

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5 - -

RATIONALE

Applied Mathematics forms the backbone of engineering students. Basic elements of algebra, trigonometry, coordinate geometry have been included in the curriculum as foundation course. This course will develop analytical abilities to make exact calculations and will provide continuing educational base to the students.

DETAILED CONTENTS

- | | | |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1. | Algebra
(hrs) | (35 |
| 1.1 | Complex numbers: Complex numbers, representation, modulus and amplitude, Demovier's theorem and its applications in solving algebraic equation. | |
| 1.2 | Geometrical progression, its nth term and sum of n terms and to infinity with application to engineering problems. | |
| 1.3 | Partial fractions (linear factors, repeated linear factors, non-reducible quadratic factors excluding repeated factors) | |
| 1.4 | Concept of permutations and Combinations: Value of nPr nCr . | |
| 1.5 | Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) | |
| 2. | Trigonometry
(hrs) | (20 |
| | Review of ratios of some standard angles (0,30,45,60,90 degrees), T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T-Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). | |
| 3. | Co-Ordinate Geometry | (25 hrs) |
| 3.1 | Equation of straight line in various standard forms (without proof), inter section of two straight lines, angle between two lines, perpendicular distance formula (without proof) | |
| 3.2 | General equation of a circle and its characteristics. To find the equation of a circle, given: | |
| * | Centre and radius | |
| * | Three points lying on it | |
| * | Coordinates of end points of a diameter | |
| 3.3 | Equations of conics (ellipse, parabola and hyperbola), simple problems related to engineering (standards forms only) | |

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.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	35	45
2	20	25
3	25	30
Total	80	100

1.3 APPLIED PHYSICS – I

L T P
4 - 2

RATIONALE

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

Note: Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles.

DETAILED CONTENTS

1. Units and Dimensions (8 hrs)
 - 1.1 Physical quantities
 - 1.2 Units - fundamental and derived units, systems of units (FPS, CGS, MKS and SI units)
 - 1.3 Dimensions and dimensional formulae of physical quantities
 - 1.4 Dimensional equations and principle of homogeneity, applications to conversion from one system of units to another, checking the correctness of physical relations and derivation of simple physical relations, limitations of dimensional analysis
 - 1.5 Error in measurement, random and systematic errors, types of errors, propagation of errors, significant figures
2. Force and Motion (12 hrs)
 - 2.1 Concept of Scalar and Vector quantities – examples, types of vectors.
 - 2.2 Resolution and Composition of vectors, Vector multiplication (scalar product and vector product of vectors), addition of vectors (Parallelogram law)
 - 2.3 Force: Newton's laws of motion, linear momentum and conservation of linear momentum, impulse and its application, simple numerical problem in brake system of vehicles and trains etc.
 - 2.4 Friction: Types of friction and its application.
 - 2.5 Circular motion: Angular displacement, angular velocity and angular acceleration
 - 2.6 Relation between linear and angular variables (velocity and acceleration)
 - 2.7 Centripetal force (derivation) and centrifugal force with application such as banking of roads and bending of cyclists
 - 2.8 Application of various forces in lifts

- 3 Rotational Motion (6 hrs)
- 3.1 Concept of translatory and rotating motion with examples
 - 3.2 Definitions of torque, angular momentum and their relationship
 - 3.3 Conservation of angular momentum (qualitative) and its examples
 - 3.4 Moment of inertia and its physical significance, radius of gyration, Theorems of parallel and perpendicular axes (statements), Moment of inertia of rod, disc, ring and sphere (Formulae only).
 - 3.5 Application of rotational motions in transport vehicles, trains and aero plane turbine/engine.
- 4 Work, Power and Energy (8 hrs)
- 4.1 Work: definition and its SI units
 - 4.2 Work done in moving an object on horizontal and inclined plane (incorporating frictional forces) with its application
 - 4.3 Power: definition and its SI units, calculation of power with numerical problems
 - 4.4 Energy: Definition and its SI units: Kinetic energy and Potential energy with examples and their derivation
 - 4.5 Principle of conservation of mechanical energy (for freely falling bodies), transformation of energy from one form to another with its application
- 5 Properties of Matter (10 hrs)
- 5.1 Elasticity: definition of stress and strain, different types of modulus of elasticity, stress – strain diagram, Hooke's law with its applications
 - 5.2 Pressure: definition, its units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications
 - 5.3 Surface tension: concept, its units, angle of contact, measurement of surface tension by capillary tube method, applications of surface tension, effect of temperature and impurity on surface tension
 - 5.4 Viscosity and coefficient of viscosity: Stoke's Law and derivation of terminal velocity, effect of temperature on viscosity.

- 6 Thermometry (10 hrs)
- 6.1 Difference between heat and temperature
 - 6.2 Principles of measurement of temperature and different scales of temperature and their relationship
 - 6.3 Types of thermometers (Concept only)
 - 6.4 Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them
 - 6.5 Modes of transfer of heat (Conduction, convection and radiation with examples)
 - 6.6 Co-efficient of thermal conductivity
 - 6.7 Engineering Application of conduction, convection and radiations
7. Waves and Vibrations (10 hrs)
- 7.1 Simple Harmonic Motion(SHM): definition, expression for displacement, velocity, acceleration, time period, frequency in S.H.M. Equation of simple harmonic progressive wave
 - 7.2 Wave motion: transverse and longitudinal wave motion with examples, sound and light waves, velocity, frequency and wave length of a wave (relationship $v = n\lambda$) and their applications
 - 7.3 Free, forced and resonant vibrations with examples
 - 7.4 Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications
 - 7.5 Ultrasonics – production (magnetostriction and piezoelectric methods) and their engineering and medical applications

LIST OF PRACTICALS (to perform minimum ten experiments)

1. To find the diameter of wire using a screw gauge
2. To find volume of solid cylinder and hollow cylinder using a vernier calipers
3. To determine the thickness of glass strip and radius of curvature using a spherometer
4. To verify parallelogram law of forces
5. To find the time period of a simple pendulum and determine the length of second's pendulum.
6. To find the frequency of a tuning fork by a sonometer

7. To find the velocity of sound by using resonance apparatus at room temperature.
8. To find the Moment of Inertia of a flywheel about its axis of rotation
9. To find the surface tension of a liquid by capillary rise method
10. To determine the atmospheric pressure at a place using Fortin's Barometer
11. To determine the viscosity of glycerin by Stoke's method
12. To determine the coefficient of linear expansion of a metal rod

INSTRUCTIONAL STATREGY

Teacher may use various teaching aids like models, charts, graphs and experimental kits etc. for imparting effective instructions in the subject. The teacher should explain about field applications before teaching the basics of mechanics, work power and energy, rotational motion, properties of matter 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.
2. Text Book of Physics for Class XII (Part-I, Part-II) N.C.E.R.T
3. Applied Physics Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, New Delhi
4. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
5. Berkeley Physics Course, Vol. I, II & III, Tata McGraw Hill, Delhi
6. Comprehensive Practical Physics, Vol. I & II, JN Jaiswal, Laxmi Publishers
7. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
8. Applied Physics I & II by RA Banwait & R Dogra, Eagle Parkashan, Jalandhar
9. Applied Physics by Jasmer Kaur and Bhupinder Singh, Lords Publications, Jalandhar
10. Engineering Physics by Vanchna Singh and Sheetal 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	Units and Dimensions	08	15
2	Force and Motion	12	20
3	Rotational Motion	06	10
4	Work, Power and Energy	08	10
5	Properties of Matter	10	15
6	Thermometry	10	15
7	Waves and Vibrations	10	15
	Total	64	100

1.4 BASICS OF INFORMATION TECHNOLOGY

L T P
- - 4

RATIONALE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. Almost all work places and living environment are being computerized. The subject introduces the fundamentals of computer system for using various hardware and software components. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

Note:

Explanation of Introductory part should be dovetailed with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Information Technology – its concept and scope, applications of IT, ethics and future with information technology
2. Impact of computer and IT in society.-- Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more
3. Generations of computer, block diagram of a computer, CPU, memory, data – numeric data, alpha numeric data; program, processing of data.
4. Computers for information storage, information seeking, information processing and information transmission, computer organization, computer hardware and software; primary and secondary memory: RAM, ROM, PROM etc. Input devices; keyboard, mouse, scanner, etc ; output devices ; VDU and Printer(Impact and non-Impact printers), Plotter etc. Primary and Secondary Storage (Auxiliary Storage), Secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD Memory)
5. Introduction to Operating Systems such as MS-DOS and Windows, difference between DOS and Windows
6. Basics of Networking – LAN, MAN,WAN, Topologies

LIST OF PRACTICALS

1. Identify and list functions of various components and peripherals of given computer.
2. Installation of operating system viz. * Windows XP, *Windows 2007 etc.
3. Installing a computer system by giving connection and loading the system-software and application software and various sources to install software
4. Exercises on entering text and data (Typing Practice)

Features of Windows as an operating system

- Start , shutdown and restore
- Creating and operating on the icons
- Opening, closing and sizing the windows
- Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file , creating and operating on a folder
- Introduction to all properties such as changing settings like, date, time, colour (back ground and fore ground)
- Using short cuts

5. Word Processing (MS Office/Open Office)

File Management:

- Opening, creating and saving a document, locating files, copying contents in some different file(s),

Editing a document:

- Entering text, Cut, copy, paste using tool- bars

Formatting a document:

- Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
- Aligning of text in a document, justification of document ,Inserting bullets and numbering
- Formatting paragraph, inserting page breaks and column breaks, line spacing
- Use of headers, footers: Inserting footnote, end note, use of comments
- Inserting date, time, special symbols, importing graphic images, drawing tools

Tables and Borders:

- Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
- Print preview, zoom, page set up, printing options

- Using Find, Replace options

6. Spread Sheet Processing (MS Office/Open Office)

Starting Excel

- open worksheet, enter, edit, data, formulae to calculate values, format data, create chart, printing chart, save worksheet, switching between different spread sheets

Menu commands:

- Create, format charts, organize, manage data, solving problem by analyzing data, creating graphs

Work books:

- Managing workbooks (create, open, close, save), working in work books, Editing a worksheet:
- copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet

Creating a chart:

- Working with chart types, changing data in chart, formatting a chart, use chart to analyze data
- Using a list to organize data, sorting and filtering data in list

Formulas:

Addition, subtraction, division, multiplication, percentage and auto sum

7. PowerPoint Presentation (MS Office/Open Office)

- Introduction to PowerPoint
 - How to start PowerPoint
 - Working environment: concept of toolbars, slide layout, templates etc.
 - Opening a new/existing presentation
 - Different views for viewing slides in a presentation: normal, slide sorter etc.
- Addition, deletion and saving of slides
- Insertion of multimedia elements

- Adding text boxes, importing pictures, movies and sound, tables and charts etc.
 - d) Formatting slides
 - Text formatting, changing slide layout, changing slide colour scheme
 - Changing background, Applying design template
 - e) How to view the slide show?
 - Viewing the presentation using slide navigator, Slide transition
 - Animation effects etc.
8. Working with Data Processing (MS Office/Open Office)
- a) Understanding different data types
 - b) Creation of table, entering data in a table and modify it.
 - c) Retrieve data with query:
 - Create a pivot table, customizing a pivot table, statistical analysis of data
 - Exchange data with other application: embedding objects, linking to other applications, import, export document.
9. Internet and its Applications
- a) Log-in to internet, introduction to search engine
Browsing and down loading of information from internet
 - b) Creating E-Mail Account
 - Log in to e-mail account and Log out from e-mail account
 - c) Managing E mail
 - Creating a message
 - sending, receiving and forwarding a message
 - attaching a file
 - Deleting a message

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals, connectors etc. and proficient in making use of MS Office/Open Office in addition to working on internet. The student should be made capable of working on computers independently. This subject should be taught with the help of LCD projector, while teaching a group.

RECOMMENDED BOOKS

1. Fundamentals of Computer by E Balagurusamy, Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
3. Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi
4. Fundamentals of Computer by Sumita Arora by Dhanpat Rai and Co , New Delhi
5. Computers Today by SK Basandara, Galgotia Publication Pvt Ltd. Daryaganj, New Delhi.
6. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
8. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
9. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
10. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar
11. Basics of Information Technology, by Ishan Publications, Ambala
12. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd , New Delhi

1.5 ENGINEERING DRAWING – I

L T P
- - 8

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. The emphasis while imparting instructions should be to develop conceptual skills in the students.

Note: 1. First angle projection is to be followed
2. Instruction relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students

DETAILED CONTENTS

1. Drawing Office Practice, Lines & Lettering **(2 Sheets)**
 - 1.1 Drawing instruments
 - 1.2 Sizes and layout of standard drawing sheets and drawing boards
 - 1.3 Different types of lines in engineering drawing as per BIS specifications
 - 1.4 Free hand lettering (alphabet and numerals) lower case and upper case, single stroke vertical and inclined at 75 degree in different standard series of 2.5, 3, 5, 7, 10, and 15 mm heights in the ratio of 7:4
2. Dimensioning **(2 Sheets)**
 - 2.1 Necessity of dimensioning, Types of dimensioning (chain, parallel and progressive dimensioning, size and location dimensioning)
Methods of placing dimensioning (Aligned and unidirectional system), use of leader lines. General principles of dimensioning.
 - 2.2 Dimensioning of overall sizes, circles, thread holes, chamfered surfaces, angles, tapered surface holes equally spaced on PCD, counter sunk hole counter bored holes, cylindrical parts, narrow space and gaps, radii, curves and arches.
3. Simple Geometrical Constructions used in Engineering Practice **(2 Sheets)**
 - 3.1 Construction of regular polygons (triangle, square, pentagon, hexagon) and circles
 - 3.2 Ellipses (concentric circle method and Intersecting Arcs method)
 - 3.3 Parabola (rectangle and tangent method), cycloid
4. Scale **(2 sheets)**
 - 4.1 Scale – their need and importance, Definition of representative fraction (R.F), find RF of given scale
 - 4.2 Construction of plain and diagonal scales
5. Principle of Projections **(7 sheets)**

- 5.1 Principle of orthographic projection and introduction to first angle projection and third angle projection
- 5.2 Projection of points situated in different quadrants (1 Sheet)
- 5.3 Projection of lines, Lines inclined to one plane and parallel to the other and vice versa (1st & 3rd quadrants) (1 Sheet)
- 5.4 Projection of Planes: Planes perpendicular and parallel to either of the planes; planes perpendicular to one plane and parallel to the other or vice versa (1st & 3rd quadrants) (1 Sheet)
- 5.5 Drawing 3 orthographic views of given objects (3 sheets - at least one sheet in 3rd Angle Projection)
- 5.6 Identification of surfaces on drawn orthographic views from isometric object drawn (1 Sheet)
- 6. Sectional Views **(1 sheet)**
Need for sectional views –Drawing of different conventions for materials in sections, conventional breaks for shafts, pipes, rectangular, square, angle, channel and rolled sections
- 7. Isometric Views **(2 sheets)**
 - 7.1 Fundamentals of isometric projections (theoretical instructions) and isometric scales
 - 7.2 Isometric views of combination of regular solids like cylinder, cone, cube, prism and pyramid
- 8. Development of Surfaces **(2 sheets)**
 - 8.1 Parallel line method (Prism and Cylinder)
 - 8.2 Radial line method (Pyramid and Cone)

RECOMMENDED BOOKS

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

1.6 GENERAL WORKSHOP PRACTICE – I

L T P
- - 8

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)

Note:

The students are supposed to come in proper workshop dress prescribed by the institute. Wearing shoes in the workshop(s) is compulsory. Importance of safety and cleanliness, safety measures and upkeep of tools, equipment and environment in each of the following shops should be explained and practiced. The students should prepare sketches of various tools/jobs in their practical Notebook.

The following shops are included in the syllabus:

1. Carpentry and Painting Shop-1
2. Fitting Shop
3. Welding Shop-I
4. Electric Shop –I
5. Smithy Shop or Electronic Shop-I
6. Sheet Metal Shop-I

Note:

1. The branches e.g. Civil Engineering, Electrical Engineering, Mechanical Engineering, Automobile Engineering, Wood Technology, Leather Technology, Food Technology, Quantity Surveying and Public Health Engineering will do **Smithy Shop** instead of Electronic Shop -I
2. The branches e.g. Electronics and Communication Engineering, Instrumentation and Control, Computer Engineering, Information Technology, and Medical Electronics will do **Electronic Shop-I** instead of Smithy Shop.

1. Carpentry and Painting Shop

- 1.1 Introduction to various types of wood such as Deodar, Kail, Partal, Teak, Mango, Sheesham, etc. (Demonstration and their identification).
- 1.2 Demonstration, function and use of commonly used hand tools. Care, maintenance of tools and safety measures to be observed.
 - Job I Marking, sawing, planning and chiseling & their practice
- 1.3 Introduction to various types of wooden joints, their relative advantages and uses.
 - Job II Preparation of half lap joint
 - Job III Preparation of Mortise and Tenon Joint
- 1.4 Demonstration of various methods of painting wooden items.
 - Job IV Preparation of surface before painting including primar coat
 - Job V Painting Practice by brush/roller/spray

2. Fitting Shop

- 2.1 Introduction to fitting shop tools, common materials used in fitting shop, Identification of materials. (e.g. Steel, Brass, Copper, Aluminium etc.). Identification of various sections of steel such as Flat, Angle, Tee, Channel, Bar Girder, Square, Z-Section, etc.
- 2.2 Description and demonstration of various types of work benches. holding devices and files. Precautions while filling.
- 2.3 Description and demonstration of simple operation of hack-sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade.
 - Job I Marking of job, use of marking tools and measuring instruments.
 - Job II Filing a dimensioned rectangular or Square piece of an accuracy of $\pm 0.5\text{mm}$
 - Job III Filing practice (Production of flat surfaces) Checking by straight edge.
 - Job IV Making a cutout from a square piece of MS Flat using Hand hacksaw.
- 2.4 Care and maintenance of measuring tools like calipers, steel rule, try square, vernier calipers, micrometer, height gauge, combination set. Handling of measuring instruments, checking of zero error, finding of least count.

3. Welding Shop – I

- 3.1 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.
- 3.2 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
- 3.3 Various types of joints and end preparation.
 - Job III Preparation of butt joint by electric arc welding.
 - Job IV Preparation of lap joint by electric arc welding.
 - Job V Preparation of corner joint by using electric arc welding.
 - Job VI Preparation of Tee joint by electric arc welding.

4. Electric Shop – I

- 4.1 Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses, ceiling roses, PVC Conduits, PVC Channels and allied items, tools and accessories.
- 4.2 Study of electrical safety measures and demonstration about use of protective devices. Such as fuses, MCBs and relays
 - Job I Identification of phase, neutral and earth of domestic appliances and their connection to two pin/three pin, plugs.
 - Job II Preparation of a house wiring circuit on wooden board using fuse, switches, socket, holder, ceiling rose etc. by PVC Conduit and PVC casing and capping.
- 4.3 Study of common electrical appliances such as electric iron, electric kettle, ceiling fan, table fan, electric mixer, electric Geyser, gas geyser, desert cooler, refrigerator, water purifier

4.4 Introduction to the construction of a Lead-acid battery and its working.

Job III Installation of inverter with battery and to connect two or more batteries in series and in parallel

Job IV Charging of a battery and testing it with the help of hydrometer and Cell Tester

5. Smithy Shop

5.1 Demonstration and detailed explanation of tools and equipment used Forging operations in Smithy shop. Safety measures to be observed in the smithy shop.

5.2 Demonstration and description of bending operation, upsetting operation, description and specification of anvils, swage blocks, hammers etc.

5.3 Demonstration and description of tongs, fullers, swages etc.

Job I To forge a L-Hook.

Job II To prepare a job involving upsetting process

Job III To forge a chisel

Job IV To prepare a cube from a M.S. round by forging method.

OR

5. Electronic Shop – I

5.1 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, soldering wire, flux and their demonstration and uses.

5.2 Identification and familiarization with Multimeter analog and digital (Three and half digit)

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

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

5.4 Identification and familiarization with ear phone speaker connector, telephone jacks and similar male and female connectors (Audio, Video)

5.5 Safety precautions to be observed in the electronic shop

5.6 Identification and familiarization with soldering and desoldering practice.

NOTE: **Demonstration boards for the electronics components such as resistor, capacitor, diodes, transistors, FETs, IFT Coils, ICs should be made.**

Job II Cut, strip, join an insulated wire with the help of soldering iron (repeat with different types of wires)

Job III Cut, strip, connect/solder/crimp different kinds of wires/ cables (including co-axial and shielded cable) to different types of power/general purpose/Audio Video/Telephone plugs, sockets, jacks, terminals, binding posts, 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

6. Sheet Metal Shop –I

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.

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

6.2 Introduction and demonstration of various machines and equipment used in sheet metal shop e.g. Shearing Machine, Bar Folder, Burring Machine, power press, sheet bending machine.

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

6.4 Study of various types of Rivets, Steel Screw etc.

Job I Shearing practice on a sheet using hand shears.

- a) Practice on making Single riveted lap joint/Double riveted lap Joint.
- b) Practice on making Single cover plate chain type, rivetted Butt Joint

RECOMMENDED BOOKS

1. Workshop Technology I, II, III by SK Hajra, Chaudhary and AK Chaudhary. 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 Technology by B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi
6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi