CURRICULUM

FOR

DIPLOMA PROGRAMME

IN

1. **Computer Engineering**
2. **Electronics and Communication Engineering**
3. **Information Technology**
4. **Instrumentation Engineering**

1st Year (1st & 2nd Semester)

FOR THE STATE OF HIMACHAL PRADESH

Implemented w.e.f. Session 2017-18

Prepared by:-
Composite Curriculum Development Centre
Directorate of Technical Education,
Vocational & Industrial Training, Sundernagar(H.P.)
In collaboration with NITTTR Chandigarh

1st YEAR OF THREE YEAR DIPLOMA PROGRAMME ENGINEERING DISCIPLINE

1. SALIENT FEATURES

1)	Name of the Programme	:	Three year Diploma Programme (Technical Stream)
2)	Duration of the Programme	:	Three years (06 Semesters)
3)	Entry Qualification	:	As prescribed by H.P. Takniki Shiksha Board/AICTE
4)	Intake	:	As approved by H.P. Takniki Shiksha Board
5)	Pattern of the Programme	:	Semester Pattern
6)	Curriculum for	:	1st year of Three year Diploma Programme (Technical Stream)

7) **Student Centered Activities:**

A provision has been made for organizing Student Centered Activities for overall personality development of students. SCA will comprise co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, cultural activities and participation in programs like technical and cultural events etc.

2.1 GUIDELINES FOR ASSESSMENT OF STUDENT CENTERED ACTIVITIES (SCA)

Distribution of marks for SCA will be as follows:

i. 20% marks shall be given for general behaviour

ii. 20% marks for attendance shall be based on the following distribution:

Attendance	Marks
Less than 65%	Nil
More than 65%	Proportionate

iii. 60% Marks shall be given for the Sports/NCC/Cultural and Co- curricular activities/other activities after due consideration to the following points:

1. For participation in sports/NCC/Cultural/ Co-curricular activities at National or above level, shall be rewarded with minimum of 40% marks
2. For participation in sports/NCC/Cultural/Co-curricular activities at Inter-polytechnic level, shall be rewarded with minimum of 30% marks
3. For participation in two or more of the listed activities, 20% extra marks should be rewarded

Note: These marks are to be sent to the H.P. Takniki Shiksha Board, Dharamsala at the end of semester along with internal assessment.

2.2 GUIDELINES FOR INTERNAL ASSESSMENT

- The distribution of marks for Internal Assessment in theory subjects shall be made as per the following guidelines:
  i. 60% of internal assessment shall be based on the performance in the tests. At least three tests shall be conducted during the semester out of which at least one should be house test. 30% weightage shall be given to house test and 30% to class test (One best out of two).
  ii. 20% marks shall be given to home assignments, class assignments, seminars, quiz etc.
  iii. 20% marks shall be given for attendance/punctuality in the subject concerned.

- The distribution of marks for Internal Assessment in practical subjects shall be made as per the following guidelines:
  i. 60% marks shall be awarded for performance in practical.
  ii. 20% marks shall be given for Report/Practical book and punctuality in equal proportion.
  iii. 20% marks shall be for Viva-voce conducted during the practical.

- The distribution of mark for internal assessment in drawing subjects shall be as per following guidelines:
  i. 60% marks for Drawing sheets
  ii. 40% for test.

STUDY AND EVALUATION SCHEME

5. Computer Engineering

6. Electronics and Communication Engineering

7. Information Technology

8. Instrumentation Engineering

STUDY AND EVALUATION SCHEME

FIRST SEMESTER

SR. NO.	Subjects	Study Scheme **Hours/Week**		Evaluation Scheme								Total Marks
				Internal Assessment			External Assessment					
		Th	**Pr**	**Th**	**Pr**	**Tot**	**Th**	**Hrs**	**Pr**	**Hrs**	**Tot**	
1.1	*English and Communication Skills – I	3	2	30	20	50	100	3	50	3	150	200
1.2	*Applied Mathematics - I	5	-	50	-	50	100	3	-	-	100	150
1.3	*Applied Physics – I	4	2	30	20	50	100	3	50	3	150	200
1.4	*Applied Chemistry – I	4	2	30	20	50	100	3	50	3	150	200
1.5	**Basics of Information Technology	-	4	-	50	50	100	3	50	3	150	200
1.6	*Engineering Drawing – I	-	6	-	50	50	100	4	-	-	100	150
1.7	*General Workshop Practice – I	-	6	-	100	100	-	-	100+	4	100	200
#Student Centered Activities		-	2	-	50	50	-	-	-	-	-	50
	Total	16	24	140	310	450	600	-	300	-	900	1350

* Common with other diploma programmes.

** Common with other diploma programmes. Theory paper will be based on the practical content.

\# SCA will comprise co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, cultural activities and participation in programs like technical and cultural events etc.

\+ Including 25 marks for viva-voce.

STUDY AND EVALUATION SCHEME

SECOND SEMESTER

Sr. No.	Subjects	Study Scheme		Evaluation Scheme								Total Marks
		Hours/Week		Internal Assessment			External Assessment					
		Th	**Pr**	**Th**	**Pr**	**Tot**	**Th**	**Hrs**	**Pr**	**Hrs**	**Tot**	
2.1	*English and Communication Skills - II	4	2	30	20	50	100	3	50	3	150	200
2.2	*Applied Mathematics – II	5	-	50	-	50	100	3	-	-	100	150
2.3	* Applied Physics-II	4	2	30	20	50	100	3	50	3	150	200
2.4	*Computer Programming using C	2	4	30	20	50	100	3	50	3	150	200
2.5	* Environmental Studies & Disaster Management	3	-	25	-	25	100	3	-	-	100	125
2.6	*Engineering Drawing-II	-	6	-	50	50	100	4	-	-	100	150
2.7	*General Workshop Practice – II	-	6	-	100	100	-	-	100+	4	100	200
#Student Centered Activities		-	2	-	25	25	-	-	-	-	-	25
	Total	18	22	165	235	400	600	-	250	-	850	1250

* Common with other diploma programmes.

\# SCA will comprise co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, cultural activities and participation in programs like technical and cultural events etc.

\+ Including 25 marks for viva-voce.

DETAILED CONTENTS

FIRST SEMESTER

1.1 ENGLISH AND COMMUNICATION SKILLS – I

L	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. It is expected that each polytechnic will establish a communication skills laboratory for conducting the practical mentioned in the curriculum.

DETAILED CONTENTS

1. **Facets of Literature**
   - 1.1 Short Stories
     - 1.1.1 Homecoming – R.N. Tagore
     - 1.1.2 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
   - 1.3 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**
   - 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
   - 2.2 Pair of words (Words commonly confused and misused)
     - 2.2.1 Identification of Tense
     - 2.2.2 Correction of incorrect sentences
     - 2.2.3 One word Substitution
     - 2.2.4 Active & Passive Voice

3. **Translation**
   - 3.1 Glossary of Administrative Terms (English and Hindi)
   - 3.2 Translation from Hindi into English and English to Hindi.

4. Paragraph of 100-150 words from the given outlines

5. **Comprehension**

   Unseen passages of literary, scientific, data /graph based for comprehension exercises.

6. **Communication**
   6.1 Definition, Elements and Process of Communication
   6.2 Levels of Communication
   6.3 Objectives of Communication

LIST OF PRACTICAL

1. The practice of the sounds of English i.e. the Phonetic Symbols (Vowels & Consonants).
2. How to look up words in a Dictionary: meaning and pronunciation of words as given in the standard dictionary using Phonetic Symbols.
3. How to seek information from an Encyclopedia.
4. Listening to pre-recorded English language learning programme.
5. Paper reading before an audience (reading unseen passages)
6. Spelling rules.
7. Essentials of a good speech to respond and comprehend visual, oral themes, situations or stimulus and practice before select gathering.
8. Exercises on use of different abbreviations
9. Greetings for different occasions
10. Introducing oneself, others and leave taking
11. Exercises on writing Notices.

Note:

1. Communication laboratory may be set up equipped with appropriate audio-video system with facility of playing CDs/DVDS and a video camera with facility to record & play back the performance of each student. A set of CDs from any language training organization e.g. B.B.C, British Council etc. may be procured for use of students.
2. Elements of body language will be incorporated in all practical.
3. The practical exercises involving writing may also be included in Theory Examination.
4. Elements of body language will be incorporated in all practical exercises.

RECOMMENDED BOOKS

1. English and Communication Skills,Book-I By Kuldip Jaidka, Alwainder Dhillon and Parmod Kumar Singla, Prescribed by NITTTR, Chandigarh Published By Abhishek Publication, 57-59, Sector-17, Chandigarh.
2. Spoken English by R.K. Bansal & J.B.Harrison Published by Orient Longman .
3. Essentials of Business Communication by Pal and Rorualling; Sultan Chand and Sons.
4. The Essence of Effective Communication, Ludlow and Panthon; Prentice Hall of India.
5. New Design English Grammar, Reading and Writing Skills by AL Kohli (Course –A and course- B), Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh.
6. 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.
7. A Practical English Grammar by Thomson and Martinet.
8. Spoken English by V Sasi Kumar and PV Dhamija; Tata McGraw Hill.
9. English Conversation Practice by Grount Taylor; Tata McGraw Hill.
10. Developing Communication Skills by Krishna Mohan and Meera Banerji; MacMillan India Ltd., Delhi.
11. Business Correspondence and Report Writing by RC Sharma and Krishna Mohan; Tata McGraw Hill Publishing Company Ltd. New Delhi.
12. Communication Skills by Ms. R Datta Roy and KK Dhir; Vishal Publication, Jalandhar.

Websites for references:

1. http:www.bbclearningenglish.com
2. http:www.mindstools.com
3. http:www.letstalk.com.in
4. http:www.learnenglish.britishcouncil.org/en/

SUGGESTED DISTRIBUTION OF MARKS		
Topic No.	**Time Allotted (Hrs)**	**Marks Allotted (%)**
1	14	40
2	10	15
3	4	10
4	8	10
5	4	10
6	8	15
Total	**48**	**100**

Glossary of Administrative Terms

1.	Senior	वरिष्ठ
2.	Cashier	खजांची
3.	Consent	सहमती
4.	Earned Leave	जमा छुट्टी
5.	Under Consideration	विचार अधीन
6.	Criterion	कसौटी
7.	Staff	कर्मचारी
8.	Tenure	कार्यकाल
9.	Working Committee	कार्य समिति
10.	Estate	संम्पदा
11.	Self-Sufficient	आत्मनिर्भर
12.	Emergency	आपात्तकाल
13.	General Body	आम सभा
14.	Exemption	छूट
15.	Daily wages	दिहाडीदार
16.	Death-Cum Retirement	मृत्यु और निवरती
17.	Despatch Register	रवानगी रजिस्टर
18.	Despatch	रवानगी
19.	Stenography	आशुलिपिक
20.	Assurance	दिलासा
21.	Justify	सही साबित करना
22.	Superior	बढिया
23.	High Commission	उच्चायुक्त
24.	Simultaneous	साथ - साथ
25.	Precautionary	एहतिहाती
26.	Commanding Office	कमांडिग अफसर
27.	Negligence	लापरवाही
28.	Performance	पुरा करना
29.	Proof Reader	प्रुफ रीड़र
30.	Take Over	काम सभालना
31.	Timely Compliance	समय दौरान पुरा करना
32.	Responsibility	जिमेदारी
33.	Chief Justice	मुख्य न्यायधिश
34.	Disciplinary Action	अनुशासनिक कारवाई
35.	Efficiency Bar	दक्षता रोक
36.	Flying Squad	उड़न दस्ता
37.	Regret	खेद
38.	Inconvenience	असुविधा
39.	Ambiguous	अस्पष्ट
40.	Part Time	अशंकालीन
41.	Academy	अकादमी
42.	Disparity	असमानता
43.	Extraordinary	असाधारण
44.	Provisional	अस्थायी
45.	Income Tax	आयकर
46.	Bonafide	असली
47.	Acting in Official Capacity	बतौर अधिकारिक हैसियत
48.	Contractor	ठेकेदार
49.	On probation	परिवीक्षाधीन
50.	State	राज्य

51.	Administrator	प्रशासक
52.	Admission	प्रवेश
53.	Aforesaid	पूर्वोक्त, उपरोक्त
54.	Affidavit	शपथपत्र
55.	Agenda	कार्यसूची
56.	Alma Mater	विद्यालय जहां किसी व्यक्ति ने शिक्षा प्राप्त
57.	Appointing Authority	मनोनित अधिकारी
58.	Apprentice	शिल्पकारू
59.	Additional	अतिरिक्त
60.	Advertisement	विज्ञापन
61.	Assistant	सहायक
62.	Assumption of Charge	अधिकार ग्रहण करना
63.	Attested Copy	सत्यापित प्रति
64.	Chief Minister	मुख्यमन्त्री
65.	Clerical Error	लेखन सम्बन्धी भ्रम
66.	Code	कानून की किताब, गुप्त भाषा
67.	Corruption	नैतिक भ्रष्टाचार, खोटापन
68.	Craftsman	कारीगर
69.	Compensation	हरजाना
70.	Compensatory Allowance	क्षतिपूरक भत्ता
71.	Compile	संकलन करना, संग्रह करना
72.	Confidential Letter	गुप्त पत्र
73.	Chief Engineer	मुख्य अभिन्यता
74.	Data	स्वीकृत तत्तव (आंकड़े)
75.	Dearness Allowance	मंहगाई भत्ता
76.	Department	विभाग
77.	Dictionary	शब्द कोष
78.	Director	निदेशक, संचालन
79.	Director of Tech. Edu.	तकनीकी शिक्षा निदेशक
80.	Executive Engineer	अधिशासी अभियन्यता
81.	Employment Exchange	व्यवसाय केन्द्र
82.	Head Office	मुख्य कार्यालय
83.	Head Clerk	प्रधान लिपिक
84.	Indian Admn. Service	भारतीय प्रशासनिक सेवा
85.	Legislative Assembly	विधान सभा
86.	Officiating	स्थानापन्न
87.	Office Record	कार्यालय रिकार्ड
88.	Office Discipline	कार्यालय अनुशासन
89.	Polytechnic	बहुतकनीकी
90.	Temporary	अस्थायी
91.	Qualified	योग्यता प्राप्त
92.	Under Investigation	जांच अधीन
93.	Sub-treasury	उप-खजाना
94.	Target Date	लक्ष्य तिथि
95.	Technical Approval	तकनीकी मान्यता
96.	Verification	जांच पड़ताल
97.	Viva-voca	मौखिक परीक्षा
98.	Write off	बटटेखाते डालना
99.	Warning	चेतावनी
100.	Yours faithfully	भवदीय

1.2 APPLIED MATHEMATICS – I

L	P
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**

1.1 Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian representation of a complex number and its conversion from one form to other, conjugate of a complex number, modulus and amplitude of a complex number, Addition, Subtraction, Multiplication and Division of a complex numbers, De-movier's theorem, its application.

1.2 Partial fractions (linear factors, repeated and non-repeated linear Factors)

1.3 Permutations and Combinations, Value of ${}^{n}P_{r}$ ${}^{n}C_{r}$.

1.4 Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems

2. **Trigonometry**

2.1 Concept of angles, measurement of angles in degrees, grades and radians and their conversions.

2.2 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).

2.3 Graphs of

$$\sin x, \cos x, \tan x \text{ and } e^{x}$$

3. **Differential Calculus**

3.1 Definition of function; Concept of limits.

Four standard limits

$$\lim_{x\to a}\frac{x^n-a^n}{x-a},\ \lim_{x\to 0}\frac{\sin x}{x},$$

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

3.2 Differentiation by definition of $\sin x, \cos x, \tan x, e^{x}, \log_a x$

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

3.4 Differentiation of trigonometric and inverse trigonometric functions, Logarithmic differentiation, Exponential functions.

3.5 Applications:

(a) Maxima and minima

(b) Equations of tangent and normal to a curve (for explicit functions only)

(c) Calculations of small errors and rate measures

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. Applied Mathematics, Vol. I & II by B.D. Moudgil & P C C h o p r a , Eagle Parkashan, Jalandhar.
6. Comprehensive Mathematics, Vol. I & II by Laxmi Publications
7. Engineering Mathematics by Dass Gupta
8. Engineering Mathematics by C Dass Chawla, Asian Publishers, New Delhi
9. Comprehensive Mathematics, Vol. I & II by Laxmi Publications
10. Engineering Mathematics, Vol I, II & III by V Sundaram et al, Vikas Publishing House (P) Ltd., New Delhi
11. Engineering Mathematics by N.Ch.S.N Iyengar et.al, Vikas Publishing House (P) Ltd., New Delhi.
12. Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.
13. Engineering Mathematics, Vol I & II by AK Gupta, MacMillan India Ltd., New Delhi.
14. Applied Mathematics Vol-1 & II by Hiteshi Publication.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	25	30
2	25	30
3	30	40
Total	**80**	**100**

1.3 APPLIED PHYSICS – I

L	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. In all contents, SI units should be followed.

DETAILED CONTENTS

1. Units and Dimensions

    1.1 Physical quantities Units - fundamental and derived units, systems of units (FPS, CGS and SI units)
    1.2 Dimensions and dimensional formulae of physical quantities (area, volume, velocity, acceleration, momentum, force, impulse, work, power, energy, surface tension, coefficient of viscosity, stress, strain, moment of inertia, gravitational constant.)
    1.3 Principle of homogeneity of dimensions
    1.4 Dimensional equations and their applications, conversion from one system of units to other, checking of dimensional equations and derivation of simple equations)
    1.5 Limitations of dimensional analysis
    1.6 Error in measurement, absolute error, relative error, rules for representing significant figures in calculation.

2. Force and Motion

    2.1 Scalar and vector quantities – examples, representation of vector, types of vectors
    2.2 Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Scalar and Vector Product.
    2.3 Resolution of Vectors and its application to lawn roller.
    2.4 Force, Momentum, Statement and Derivation of Conservation of linear momentum, its applications such as recoil of gun.
    2.5 Impulse and its Applications
    2.6 Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period.
    2.7 Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical)
    2.8 Expression and Applications of Centripetal and centrifugal forces with examples such as banking of roads and bending of cyclist

3. Work, Power and Energy

    3.1 Work: and its units, examples of zero work, positive work and negative work
    3.2 Friction: modern concept, types, laws of limiting friction, Coefficient of friction and its Engineering Applications.
    3.3 Work done in moving an object on horizontal and inclined plane for rough and plane surfaces with its applications
    3.4 Energy and its units: Kinetic energy and gravitational potential energy with examples and their derivation
    3.5 Principle of conservation of mechanical energy for freely falling bodies, examples of transformation of energy.
    3.6 Power and its units, calculation of power in numerical problems

4 Rotational Motion

    4.1 Concept of translatory and rotatory motions with examples
    4.2 Definition of torque and angular momentum and their examples
    4.3 Conservation of angular momentum (quantitative) and its examples

4.4 Moment of inertia and its physical significance, radius of gyration for rigid body, Theorems of parallel and perpendicular axes (statements only), Moment of inertia of rod, disc and ring (Formulae only no derivation).

5. Properties of Matter

5.1 Elasticity: definition of stress and strain, different types of modulii of elasticity, Hooke's law, significance of stress strain curve

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, Ascent Formula (No derivation), applications of surface tension, effect of temperature and impurity on surface tension

6. Thermometry

6.1 Difference between heat and temperature

6.2 Modes of transfer of heat (Conduction, convection and radiation with examples)

6.3 Different scales of temperature and their relationship

6.4 Types of Thermometer (Mercury Thermometer, Bimetallic Thermometer, Platinum resistance Thermometer, Pyrometer)

6.5 Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them

6.6 Concept of Co-efficient of thermal conductivity

LIST OF PRACTICALS

1. To find volume of solid sphere using a Vernier Calliper
2. To find internal diameter and depth of a beaker using a Vernier Calliper and hence find its volume.
3. To find the diameter of wire using a screw gauge
4. To determine the thickness of glass strip using a spherometer
5. To verify parallelogram law of forces
6. To study conservation of energy of a ball or cylinder rolling down an inclined plane.
7. To find the Moment of Inertia of a flywheel about its axis of rotation
8. To determine force constant of spring using Hooke's law

RECOMMENDED BOOKS

1. Text Book of Physics for Class XI (Part-I, Part-II); N.C.E.R.T., Delhi
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. A Text Book of Optics, Subramanian and Brij Lal, S Chand & Co., New Delhi
5. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
6. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
7. Applied Physics I & II by RA Banwait & R Dogra, Eagle Parkashan, Jalandhar
8. Engineering Physics by DK Bhhatacharya & Poonam Tandan; Oxford University Press, New Delhi

SUGGESTED DISTRIBUTION OF MARKS		
Topic	**Time Allotted (Hrs)**	**Marks Allotted (%)**
1.	10	15
2.	12	20
3.	10	15
4.	10	15
5.	12	20
6.	10	15
Total	**64**	**100**

1.4 APPLIED CHEMISTRY – I

L	P
4	2

RATIONALE

The use of various chemicals and chemical products in diverse technical and engineering fields have repeatedly proved the importance of Applied Chemistry, which enhances its role to a new peak. On the other hand, ever increasing use of such materials will compel engineers, technocrats to acquire essential applied chemistry knowledge in order to select engineering materials, which not only suit them but also provide more environmental compatibility. This situation demands principles of Applied Chemistry in diploma-engineering courses. Principles of Applied Chemistry will enable budding engineers and technocrats to develop scientific temper and appreciate physical, chemical and engineering properties of materials. Hence the subject of Applied Chemistry.

DETAILED CONTENTS

1. Basic Concepts of Chemistry

1.1 Physical Classification of matter –solids, liquids, gases.
1.2 Chemical Classification of matter – elements, compounds and mixtures
1.3 Symbols of elements and valency, writing of chemical formulae of simple compounds.
1.4 Calculation of percentage of elements in the following compounds using atomic and molecular masses: $CaCO_3$, NaCl, $CuSO_4$, NaOH, $Ca(OH)_2$, H_2SO_4, $C_2H_2O_4$. (Atomic mass of elements should be provided)
1.5 Chemical equations, thermo-chemical equations, balancing of chemical equations (hit and trial method)

2. Atomic Structure, Periodic Table and Chemical Bonding

2.1 Fundamental particles- mass and charges of electrons, protons and neutrons with names of the scientists who discovered these fundamental particles.
2.2 Bohr's model of atom, successes and limitations of atomic theory (qualitative treatment only).
2.3 Atomic number, atomic mass, isotopes and isobars.
2.4 Definition of orbit and orbitals, shapes of s and p orbitals only, quantum numbers and their significance,
2.5 Aufbau's principle, Pauli's exclusion principle and Hund's rule, electronic configuration of elements with atomic number (Z) = 1 to 30 only. (Electronic configurations of elements with atomic number greater than 30 are excluded).
2.6 Modern periodic law and periodic table, groups and periods, classification of elements into s, p, d and f blocks (periodicity in properties - excluded)
2.7 Chemical bonding, cause of bonding and types such as ionic bond in NaCl sigma (σ) and pi (π) covalent bonds in H_2, HCl, Cl_2, elementary idea of hybridization in $BeCl_2$, BF_3, CH_4, NH_3 and H_2O.
2.8 Metallic bonding- explanation with the help of electron gas (sea) model.

3. Solutions

3.1 Definition of solution, solute and solvent with examples
3.2 Methods to express the concentration of solution- molarity (M), molality (m) and normality (N) and numerical based on calculation of M, m and N
3.3 Introduction to pH of solution, numericals on pH and industrial applications of pH.
3.4 Definition of buffer solution and industrial applications of buffer solutions.

4. Water

4.1 Demonstration of water resources on Earth using pie chart.
4.2 Classification of water – soft water and hard water, action of soap on hard water, types of hardness, causes of hardness, units of hardness – mg per liter (mgL^{-1}) and part per million (ppm) and simple numericals.
4.3 Disadvantages caused by the use of hard water in domestic and boiler feed water.

4.4 Removal of hardness - Permutit process and Ion-exchange process.
4.5 Water quality and its importance – Water quality standards as per WHO.
4.6 Natural water sterilization by chlorine, UV radiation and reverse osmosis.

5. Electro Chemistry

5.1 Electronic concept of oxidation, reduction and redox reactions
5.2 Definition of terms: electrolytes, non-electrolytes with suitable examples
5.3 Faradays laws of electrolysis and simple numerical problems.
5.4 Industrial Application of Electrolysis – Electroplating, electrolytic refining and electrometallurgy.
5.5 Application of redox reactions in electrochemical cells – commercial dry cell (Primary), commercially used lead storage battery, mercury cell, nickel-cadmium rechargeable cell and lithium ion battery (Secondary cell).

6. Organic Chemistry

6.1 Tetra valency and catenation property of carbon to produce huge orgnic compounds.
6.2 Classification of organic compounds on the bases of functional groups
6.3 Nomenclature of simple organic compounds in accordance with I.U.P.A.C. (compounds having two carbon atoms in a molecule belongs to alkanes, alkenes, alkynes, alkyl halides, alcohols, ethers, aldehydes, ketones, carboxylic acids, esters, amines) (compounds containing more than one functional groups are excluded) and their common names (if any)

LIST OF PRACTICALS

1. Volumetric analysis and apparatus used in volumetric analysis
2. Preparation of standard solution of oxalic acid or potassium permanganate
3. To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein as indicator.

   OR

   Volumetric estimation of ferrous ammonium sulfate solution by titrating it against standard potassium permanganate solution in acidic medium
4. Experimental verification of Faraday's first law of electrolysis using copper sulfate solution and copper electrode.
5. To prepare Mohr's salt from ferrous sulfate and ammonium sulfate.
6. Determination of pH of given solution using pH meter.
7. Estimation of total hardness of water using standard EDTA solution and using eriochrome black-T (solochrome black-T) indicator and approximately neutral buffer solution (pH range 7-11).

   OR

   Estimation of total alkalinity of given water sample by titrating it against standard sulfuric acid solution.

RECOMMENDED BOOKS

1. Chemistry in Engineering by J.C. Kuricose & J. Rajaram, Tata McGraw Hill, Publishing Company Limited, New Delhi.
2. Engineering Chemistry by P.C. Jain & Monika Jain, Dhanapat Rai Publishing Company, New Delhi.
3. Eagle's Applied Chemistry - I by S. C. Ahuja & G. H. Hugar, Eagle Prakashan, Jalandhar.
4. Engineering Chemistry – A Text Book by H. K. Chopra & A. Parmar, Narosa Publishing House, New Delhi.
5. Applied Chemistry - I by Dr. P. K Vij & Shiksha Vij, Lords Publications, Jalandhar.
6. Engineering Chemistry by Dr. Himanshu Pandey, Goel Publishing House, Meerut, India.

SUGGESTED DISTRIBUTION OF MARKS		
Topics	**Time Allotted (hrs)**	**Marks Allotted (%)**
1.	08	12
2.	14	22
3.	08	12
4.	14	22
5.	14	22
6.	06	10
Total	**64**	**100**

1.5 BASICS OF INFORMATION TECHNOLOGY

L	P
-	4

RATIONALE

Information technology has great influence on all aspects of 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 using MS Office/Open Office/Libre 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:

1. Explanation of Introductory part should be demonstrated with practical work. Following topics may be explained in the laboratory along with the practical exercises.

2. Theory paper will cover the following content including content given in practical exercises

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Basic Concepts of IT and Its Application

Information Technology concept and scope, applications of IT. in office, Air and Railway Ticket reservation, Banks financial transactions, E-Commerce and E- Governance applications etc., Ethics of IT, concept of online frauds, threats of IT crimes.

2. Computer Hardware

Block diagram of a computer, components of computer system, CPU, Memory, Input devices; keyboard, Scanner, mouse etc; Output devices; VDU, LCD, Printers etc. Primary and Secondary Memory: RAM, ROM, magnetic disks – tracks and sectors, optical disk (CD , DVD & Blue Ray Disk.), USB/Flash Drive.

3. Software Concepts

System software, Application software, Virtualization software and Utility software, Introduction of Operating System, Installation of Window / linux, Features of OPEN OFFICE/MS_OFFICE(MS word, Excel, PowerPoint) .

4. Internet Concepts

Basics of Networking – LAN, WAN, Wi-Fi technologies and sharing of printers and other resources, Concept of IP addresses, DNS, introduction of internet, applications of internet like: e-mail and browsing, concept of search engine and safe searching. Various browsers like Internet explorer/Microsoft Edge, Mozilla Firefox, use of cookies and history, WWW (World Wide Web), hyperlinks, introduction to Anti-virus.

LIST OF PRACTICAL EXERCISES

1. Given a PC, name its various components and peripherals. List their functions
2. Installing various components of computer system and installing system software and application software
2 Installation of I/O devices, printers and installation of operating system viz. Windows/BOSS/ LINUX
4. Features of Windows as an operating system
   - Start
   - Shut down and restore
   - Creating and operating on the icons
   - Opening, closing and sizing the windows and working with windows interfacing elements (option buttons, checkbox, scroll etc.)
   - Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file and folders
   - Changing settings like, date, time, colour (back ground and fore ground etc.)
   - Using short cuts

- Using on line help

5. Word Processing (MS Office/Open Office)

a) File Management:
   - Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, giving password protection for a file

b) Page set up:
   - Setting margins, tab setting, ruler, indenting

c) Editing a document:
   - Entering text, cut, copy, paste using tool- bars

d) 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, autotext
   - Inserting date, time, special symbols, importing graphic images, drawing tools

e) 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

f) Using Tools like:
   - Spell checker, help, use of macros, mail merge, thesaurus word content and statistics, printing envelops and labels
   - Using shapes and drawing toolbar,
   - Working with more than one window.

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

a) Starting excel, open worksheet, enter, edit, data, formulae to calculate values, format data, save worksheet, switching between different spread sheets

b) Menu commands:

Create, format charts, organise, manage data, solving problem by analyzing data. Programming with Excel Work Sheet, getting information while working

c) Work books:

Managing workbooks (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations
Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet, conditional formatting

d) Creating a chart:

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

e) Retrieve data with query:

Create a pivot table, customizing a pivot table. Statistical analysis of data

f) Exchange data with other application:

Embedding objects, linking to other applications, import, export document.

7. PowerPoint Presentation (MS Office/Open Office)

a) Introduction to PowerPoint
- How to start PowerPoint
- Working environment: concept of toolbars, slide layout & templates.
- Opening a new/existing presentation
- Different views for viewing slides in a presentation: normal, slide sorter.

b) Addition, deletion and saving of slides

c) Insertion of multimedia elements
- Adding text boxes
- Adding/importing pictures
- Adding movies and sound
- Adding tables and charts etc.
- Adding organizational chart
- Editing objects
- Working with Clip Art

d) Formatting slides
- Using slide master
- 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, timing, order etc.

f) Use of Pack and Go Options.

8. Internet and its Applications

a) Establishing an internet connection.
b) Browsing and down loading of information from internet.
c) Sending and receiving e-mail
- Creating a message
- Creating an address book
- Attaching a file with e-mail message
- Receiving a message
- Deleting a message

d) Assigning IP Addresses to computers and use of domain names.

9. Functioning of Antivirus

a) Installation and updation of an antivirus.
b) How to scan and remove the virus.

RECOMMENDED BOOKS

1. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
2. Information Technology for Management by Henery Lucas, Tata McGraw Hills, New Delhi
3. Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi
4. Computers Today by SK Basandara, Galgotia publication Pvt Ltd. Daryaganj, New Delhi.
5. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
6. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
8. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
9. On Your Marks - Net…Set…Go… Surviving in an e-world by Anushka Wirasinha, Prentice Hall of India Pvt. Ltd., New Delhi
10. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar

Suggested Distribution of Marks	
Topic No.	**Marks Allotted (%)**
1	**15**
2 (Practical No. 1, 2 and 3)	**20**
3 (Practical No. 4, 5, 6 and 7)	**40**
4 (Practical No. 8 and 9)	**25**
Total	**100**

1.6 ENGINEERING DRAWING - I

L	P
-	6

RATIONALE

Drawing is the language of Engineers and Technicians. Reading and interpreting Engineering Drawing is their day to day responsibility. The subject is aimed at developing basic graphic skills in the students 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 following BIS SP 46 – 1988.

Note:

i) First angle projection is to be followed
ii) Minimum of 16 sheets to be prepared and atleast 1 sheet on AutoCAD
iii) Instructions relevant to various drawings may be given along with appropriate demonstrations, before assigning drawing practice to students

DETAILED CONTENTS

1. Introduction to Engineering Drawing (03 sheets)

1.1 Introduction to drawing instruments, materials, layout and sizes of drawing sheets and drawing boards.
1.2 Different types of lines in Engineering drawing as per BIS specifications
1.3 Practice of vertical, horizontal and inclined lines, geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagonal, pentagon with the help of drawing instruments.
1.4 Free hand and instrumental lettering (Alphabet and numerals) – upper case (Capital Letter), single stroke, vertical and inclined at 75 degrees, series of 5,8,12 mm of free hand and instrumental lettering of height 25 to 35 mm in the ratio of 7:4

2. Dimensioning Techniques (01 sheet)

2.1 Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions)
2.2 Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., counter sunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches

3. Scales (01 sheet)

3.1 Scales –their needs and importance (theoretical instructions), type of scales, definition of R.F. and length of scale
3.2 Drawing of plain and diagonal scales

4. Orthographic Projections (06 sheets)

4.1 Theory of orthographic projections (Elaborate theoretical instructions)
4.2 Projection of Points in different quadrant
4.3 Projection of Straight Line (1^{st} and 3^{rd} angle)
4.3.1. Line parallel to both the planes
4.3.2. Line perpendicular to any one of the reference plane
4.3.3. Line inclined to any one of the reference plane.
4.4 Projection of Plane – Different lamina like square, rectangular, triangular and circle inclined to one plane, parallel and perpendicular to another plane in 1^{st} angle only
4.5 Three views of orthographic projection of different objects. (At least one sheet in 3^{rd} angle)
4.6 Identification of surfaces

5. Sections (02 sheets)

5.1 Importance and salient features
5.2 Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections.
5.3 Convention sectional representation of various materials, conventional breaks for shafts, pipes, rectangular, square, angle, channel, rolled sections
5.4 Orthographic sectional views of different objects.

6. Isometric Views (02 sheets)

6.1 Fundamentals of isometric projections and isometric scale.
6.2 Isometric views of combination of regular solids like cylinder, cone, cube and prism.

7. Common Symbols and Conventions used in Engineering (02 sheets)

7.1 Civil Engineering sanitary fitting symbols
7.2 Electrical fitting symbols for domestic interior installations

8. Introduction to AutoCAD* (02 sheets)

Basic introduction and operational instructions of various commands in AutoCAD. At least two sheets on AutoCAD of cube, cuboid, cone, pyramid, truncated cone and pyramid, sphere and combination of above solids.

*** Auto CAD drawing will be evaluated internally for sessional assessment.**

RECOMMENDED BOOKS

1. A Text Book of Engineering Drawing by Surjit Singh; Dhanpat Rai & Co., Delhi
2. Engineering Drawing by PS Gill; SK Kataria & Sons, New Delhi
3. Elementary Engineering Drawing in First Angle Projection by ND Bhatt; Charotar Publishing House Pvt. Ltd., Anand
4. Engineering Drawing I & II by JS Layall; Eagle Parkashan, Jalandhar
5. Engineering Drawing I by DK Goel, GBD Publication.

1.7 GENERAL WORKSHOP PRACTICE – I

(Common for all branches)

L	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 hands-on experience about use of different tools and basic manufacturing practices. This subject aims at developing general manual and machining skills in the students. In addition, the development of dignity of labour, safety at work place, team working and development of right attitude are the other objectives.

DETAILED CONTENTS (PRACTICAL EXERCISES)

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. Welding Shop – I
2. Fitting Shop – I
3. Sheet Metal Shop – I
4. Electric Shop-I
5. Carpentry Shop – I
6. Smithy Shop – I

1. WELDING SHOP – I

1.1 Introduction and importance of welding as compared to other material joining processes. Specifications and type of welding machines, classification and coding of electrodes, welding parameters, welding joints and welding positions. Materials to be welded, safety precautions.

1.2 Jobs to be prepared

Job I Practice of striking arc (Minimum 4 beads on 100 mm long M.S. flat).

Job II Practice of depositing beads on plate at different current levels. (Minimum 4 beads on M.S. plate at four setting of current level).

Job III Preparation of lap joint using arc welding process.

Job IV Preparation of butt joint using arc welding process. (100 mm long).

Job V Preparation of T Joint using gas or arc welding (100mm x 6 mm M.S. Flat).

2. FITTING SHOP – I

2.1 Use of personal protective equipment and safety precautions while working.

2.2 Basic deburring processes.

2.3 Introduction to fitting shop tools, marking and measuring devices/equipment.

2.4 Identification of materials. (Iron, Copper, Stainless Steel, Aluminium etc.)

2.5 Identification of various steel sections (flat, angle, channel, bar etc.).

2.6 Introduction to various fitting shop operations/processes (Hacksawing, Drilling, Chipping and Filing).

Job I Marking of job, use of marking tools, filing and use of measuring instruments. (Vernier calliper, Micrometer and Vernier height gauge).

Job II Filing a rectangular/square piece to maintain dimensions within an accuracy of $\pm .25$ mm.

Job III Making a cut-out from a square piece of MS flat using hand hacksaw and chipping.

3. SHEET METAL SHOP – I

3.1. 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.

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

3.3 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.

3.4 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 sheet etc.

3.5 Study of various types of nuts, bolts, rivets, screws etc.

Job I Shearing practice on a sheet using hand shears.

Job II Practice on making Single riveted lap joint/Double riveted lap Joint.

Job III Practice on making Single cover plate chain type, zig-zag type and single riveted Butt Joint.

4. ELECTRIC SHOP - I

4.1 Study, demonstration and identification of common electrical materials with standard ratings and specifications such as wires, cables, switches, fuses, cleats, clamps and allied items, tools and accessories.

4.2 Study of electrical safety measures and protective devices.

Job I Identification of phase, Neutral and Earth wires for connection to domestic electrical appliances and their connections to three pin plugs.

Job II Carrying out house wiring circuits using fuse, switches, sockets, ceiling rose etc. in batten or P.V.C. casing-caping.

4.3 Study of common electrical appliances such as auto electric iron, electric kettle, ceiling/table fan, desert cooler etc.

4.4 Introduction to the construction of lead acid battery and its working.

Job III Installation of battery and connecting two or three batteries in series and parallel.

4.5 Introduction to battery charger and its functioning.

Job IV Charging a battery and testing with hydrometer and cell tester

5. CARPENTRY SHOP - I

5.1 General Shop Talk

5.1.1 Name and use of raw materials used in carpentry shop : wood & alternative materials

5.1.2 Names, uses, care and maintenance of hand tools such as different types of Saws, C-Clamp, Chisels, Mallets, Carpenter's vices, Marking gauges, Try-squares, Rulers and other commonly used tools and materials used in carpentry shop by segregating as cutting tools, supporting tools, holding tools , measuring tools etc.

5.1.3 Specification of tools used in carpentry shop.

5.1.4 Different types of Timbers, their properties, uses & defects.

5.1.5 Seasoning of wood.

5.1.6 Estimation.

5.2 Practice

5.2.1 Practices for Basic Carpentry Work

5.2.2 Sawing practice using different types of saws

5.2.3 Assembling jack plane — Planning practice including sharpening of jack plane cutter

5.2.4 Chiselling practice using different types of chisels including sharpening of chisel

5.2.5 Making of different types of wooden pin and fixing methods. Marking measuring and inspection of jobs.

5.3 Job Practice

Job 1 Marking, sawing, planning and chiselling and their practice

Job II Half Lap Joint (cross, L or T – any one)

Job III Mortise and Tenon joint (T-Joint)

Job IV Dove tail Joint (Lap or Bridle Joint)

6. SMITHY SHOP - I

6.1 General Shop Talk

6.1.1 Purpose of Smithy shop

6.1.2 Different types of Hearths used in Smithy shop

6.1.3 Purpose, specifications, uses, care and maintenance of various tools and equipments used in hand forging by segregating as cutting tools, supporting tools, holding tools, measuring tools etc.

6.1.4 Types of fuel used and maximum temperature obtained

6.1.5 Types of raw materials used in Smithy shop

6.1.6 Uses of Fire Bricks & Clays in Forging workshop.

6.2 Practice

6.2.1 Practice of firing of hearth/Furnace, Cleaning of Clinkers and Temperature Control of Fire.

6.2.2 Practice on different basic Smithy/Forging operations such as Cutting, Upsetting, Drawing down, Setting down, Necking, Bending, Fullering, Swaging, Punching and Drifting

a) Demonstration — Making cube, hexagonal cube, hexagonal bar from round bar

6.2.3 Practice of Simple Heat treatment processes like Tempering, Normalizing Hardening etc

Job Practice: Job Preparation

Job I Making a cold / hot, hexagonal / octagonal flat chisel including tempering of edges.

Job II Production of utility goods e.g. hexagonal bolt / square shank boring tool, fan hook (long S-type) [Two jobs are to be done by the students].

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

RECOMMENDED BOOKS

1. Workshop Technology I,II,III, by SK Hajra, Choudhary and AK Choudhary; Media Promoters and Publishers Pvt. Ltd. Mumbai.
2. Workshop Technology Vol. I, II, III by Manchanda; India Publishing House, Jalandhar.
3. Workshop Training Manual Vol. I, II by S.S. Ubhi; Katson Publishers, Ludhiana.
4. Manual on Workshop Practice by K Venkata Reddy; MacMillan India Ltd., New Delhi
5. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
6. Workshop Technology by B.S. Raghuwanshi; Dhanpat Rai and Co., New Delhi
7. Workshop Technology by HS Bawa; Tata McGraw Hill Publishers, New Delhi.

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	16
2	16	16
3	16	18
4	16	16
5	16	16
6	16	18
Total	**96**	**100**

SECOND SEMESTER

2.1 ENGLISH AND COMMUNICATION SKILLS - II

L	P
4	2

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. It is expected that each polytechnic will establish a **communication skill laboratory** for conducting the practical mentioned in the curriculum.

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DETAILED CONTENTS

1. **Facets of Literature**
   - 1.1 Short stories
     - 1.1.1 The Portrait of a Lady - Khushwant Singh
     - 1.1.2 The Refugees –Pearl S.Buck
   - 1.2 Prose
     - 1.2.1 Forgetting- Robert Lynd.
     - 1.2.2 Walking Tours- Robert Louis Stevenson
   - 1.3 Poems
     - 1.3.1 All The World's A Stage -William Shakespeare
     - 1.3.2 No Men are Foreign- James Kirkup
2. **The Art of Précis Writing**
3. **Grammar and Usage**
   - 3.1 Narration
   - 3.2 Idioms and Phrases
   - 3.3 One Word Substitution
4. **Correspondence**
   - 4.1 Business Letters
   - 4.2 Personal letters
   - 4.3 Application for Job (Resume & Covering Letter)
5. **Drafting**
   - 5.1 Essentials of Report Writing
   - 5.2 Inspection Notes
   - 5.3 Memos, Circulars
   - 5.4 Press Release
   - 5.5 Agenda and Minutes of Meetings
6. **Glossary of Technical & Scientific Terms**
7. **Communication**
   - 7.1 Media and Modes of Communication
   - 7.2 Channels of Communication
   - 7.3 Barriers to Communication
   - 7.4 Listening Skills-Types of Listening
   - 7.5 Body language

LIST OF PRACTICAL EXERCISES:

1. Exercises on conversion of Phonetic Transcriptions to words & vice-versa
2. Group Discussions
3. Mock Interviews
4. Telephone Etiquette-demonstration and practice
5. Situational Conversations with feedback through video recording
6. Presentation on a given theme (using Power Point)
7. Exercises leading to personality development like mannerism, etiquettes, body language etc.
8. Reading unseen passages
9. Writing (developing) a paragraph
10. Just a minute session – Extempore Speech.

Note:

1. ***A*** *communication laboratory may be set up equipped with appropriate audio-video system with facility of playing CDs/DVDS and a video camera with facility to record & play back the performance of each student. A set of CDs from any language training organization e.g. B.B.C, British Council etc. may be procured for use of students.*
2. *Elements of body language will be incorporated in all practical.*
3. *The practical exercises involving writing may also be included in Theory Examination.*

RECOMMENDED BOOKS:

1. *English &Communication Skills, Book-II By Kuldip Jaidka, Alwainder Dhillon and Parmod Kumar Singla, Published By Abhishek Publication,57-59, Sector-17,Chandigarh*
2. *Spoken English by R.K. Bansal & J.B.Harrison Published by Orient Longman*
3. *Essentials of Business Communication by Pal and Roruallingㅤ; Sultan Chand and Sons*
4. *The Essence of Effective Communication, Ludlow and Panthon; Prentice Hall of India*
5. *New Design English Grammar, Reading and Writing Skills by 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 K.K. Dhir; Vishal Publication, Jalandhar*

Websites for references:

1. http:www.bbclearningenglish.com
2.http:www.mindstools.com
3. http:www.letstalk.com.in
4. http:www.learnenglish.britishcouncil.org/en/

SUGGESTIVE DISTRIBUTION OF MARKS		
Topic No.	**Time Allotted (Hrs.)**	**Marks Allotted (%)**
1	**15**	**25**
2	**05**	**05**
3	**15**	**25**
4	**08**	**15**
5	**05**	**10**
6	**05**	**05**
7	**11**	**15**
Total	**64**	**100**

GLOSSARY OF TECHNICAL & SCIENTIFIC TERMS

1. Absolute	परम, अचर, पूर्ण, स्थिर
2. Acceleration	त्वरण, प्रवेग
3. Acid	अम्ल
4. Alkaline	क्षारीय, खारा
5. Air Compressor	वायु-संपीडक
6. Air Conditioning	वातानुकूलन
7. Alignment	सरेखन
8. Alternating Current	प्रत्यावर्ती धारा
9. Altimeter	ऊंचाई मापने का यंत्र
10. Alum	फिटकरी
11. Ammeter	अम्मीटर
12. Ampere	ऐम्पियर
13. Amplication	प्रवर्धन
14. Amplitude	आयाम
15. Angle	कोण
16. Angluar Velocity	कोणीय वेग
17. Angular Momentum	कोणीय संवेग
18. Annealing	तापानुशीतन
19. Anode	अनोड
20. Apex	शीर्ष, शिखर, शिखाग्र
21. Apparent	स्पष्ट
22. Applied Machanics	अनुप्रयुक्त यंत्रिकी
23. Applied Science	अनुप्रयुक्त विज्ञान
24. Archimedes's Principle	आर्किमिडीज़ का सिद्धांत
25. Architecture	वास्तुकला, स्थापत्यकला
26. Armature	आर्मेचर
27. Atom	परमाणु
28. Automatic	स्वचलित
29. Axis	अक्ष
30. Axle	धुरी
31. Balance (Scale)	तुला, तराजू
32. Ball Bearing	बाल-बेयरिंग
33. Bar magnet	छड़-चुम्बक
34. Barometer	वायुदाबमापी
35. Base	आधार
36. Base Plate	आधार पट्टिका
37. Battery	बैटरी
38. Beaker	बीकर
39. Bending Moment	वंकन आधूर्ण
40. Blast Furnace	झोंका भट्टी
41. Bleach	विरंजक
42. Boiler	उबालक
43. Bridge	पुल
44. Burette	ब्यूरेट
45. Callipers	कैलिपर्स
46. Calorie	कैलोरी
47. Canal	नहर
48. Capacitance	धारिता
49. Carburettor	कार्बुरेटर
50. Cast Iron	ढलवा लोहा

51.	Catalyst	उत्प्रेरक
52.	Cathode	कैथोड
53.	Centre of Gravity	गुरुत्वाकर्षण – केन्द्र
54.	Centrifugal	उपकेन्द्रीय
55.	Centripetal	अभिकेन्द्रीय
56.	Centroid	केन्द्रीय
57.	C.G.S. System	सी.जी.एस. पद्धति
58.	Chemical Action	रासायनिक क्रिया
59.	Chai	श्रृंखला, माला ·
60.	Change of State	अवस्था परिवर्तन
61.	Characteristics	लक्षण
62.	Charge (n)	आवेश
63.	Choke	चोक
64.	Chord, Major	गुरु स्वर – संघात
65.	Chord, Minor	लघु स्वर – संघात
66.	Circular	वृत्ताकार, वर्तुल
67.	Clock-wise	दक्षिणा वर्त
68.	Coagulatio	स्कंदन
69.	Coefficient of Expansion	प्रसार गुणांक
70.	Coil	कुंडली
71.	Combustion	दहन
72.	Compass	दिशासूचक
73.	Compound	यौगिक
74.	Concave	अवतल
75.	Convex	उत्तल
76.	Concentrated (Solution)	गाढ़ा, सांद्रित (घोल)
77.	Concrete	कंकरीट
78.	Conduction	चालन
79.	Conductor	चालक
80.	Cone	शंकु
81.	Connection	सम्बंध, जोड़
82.	Constant (Adj.)	स्थिर, अचल, एकसमान
83.	Convection	संवहन
84.	Coulomb	कूलोम (विद्युत शक्ति की इकाई)
85.	Couple	बल युग्म
86.	Crane	क्रेन
87.	Crystalline	रवेदार
88.	Dehydrate	निर्जल करना
89.	Distil	आसहन करना
90.	Effervescence	बुदबुदाहट
91.	Element	तत्त्व, मूलतत्त्व
92.	Empirical Formula	मूलअनुपाती सूत्र
93.	Equivalent Weight	तुल्यांकी – भार
94.	Flame Test	ज्वाला – परीक्षण
95.	Flash Point	प्रज्वलन – ताप
96.	Flask	फ्लास्क
97.	Spring Balance	कमानी तुला
98.	Soluble	विलयशील
99.	Viscosity	गाढ़ापन
100.	Volumetric Analysis	आयतनी विश्लेषण

2.2 APPLIED MATHEMATICS – II

L	P
5	-

RATIONALE

Applied Mathematics forms the back bone 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**

1.1 Determinants: Elementary properties of determinants upto 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.

2. **Co-ordinate Geometry**

2.1 Equations of straight line in various standard forms (without proof), inter section of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula

2.2 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;

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard Equations without proof.
Problems on conics when their foci, directrices and vertices are given.

3. **Integral Calculus**

3.1 Integration as inverse operation of differentiation

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

3.3 Use of formulas

$$\int_0^{\pi/2} Sin^n x\,dx, \quad \int_0^{\pi/2} Cos^n x\,dx, \quad \int_0^{\pi/2} Sin^m x\, Cos^n x\,dx$$

For solving problems where m, n are positive integers

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).

4. **Vector Algebra**

4.1 Definition notation and rectangular resolution of a vector

4.2 Addition and subtraction of vectors.

4.3 Scalar and vector products of 2 vectors.

4.4 Simple problems related to work, moment and angular velocity

5. **Differential Equations**

Solution of first order and first degree differential equation by variable separation method (simple problems). MATLAB – Simple Introduction.

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/B.D. Moudgil & P.C. Chopra, 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. *Comprehensive Mathematics, Vol. I & II by Laxmi Publications*
9. *Engineering Mathematics, Vol I ,II & III by V. Sundaramet.al, Vikas Publishing House (P)Ltd., New Delhi*
10. *Engineering Mathematics by N. Ch. S. N Iyengaret.al, Vikas Publishing House(P) Ltd., New Delhi*
11. *Engineering Mathematics ,Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,*
12. *Engineering Mathematics, Vol I & II by AK Gupta, Macmillan India Ltd., New Delhi*

SUGGESTED DISTRIBUTION OF MARKS		
TOPIC NO.	TIME ALLOTTED	MARKS ALLOTTED (%)
1	12	20
2	18	20
3	34	40
4	10	10
5	06	10
Total	80	100

2.3 APPLIED PHYSICS – II

L	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

Section – A : Waves and Applications

1. **Waves and vibrations**

1.1 Wave motion with examples, generation of waves by vibrating particles
1.2 Types of wave motion - transverse and longitudinal wave motion, velocity, frequency and wave length of a wave. Relationship between wave velocity, frequency and wave length.
1.3 Simple harmonic motion: definition, expression for displacement, velocity, acceleration, time period, frequency in S.H.M.
1.4 Free, forced and resonant vibrations with examples
1.5 Numerical based on S.H.M.

2. **Applications of sound waves**

2.1 Sound Waves, Beats, Doppler effect of sound, apparent frequency, determination of apparent frequency(when the source of sound moving towards and away from stationary observer).
2.2 Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time. Simple numerical on reverberation time.
2.3 Ultrasonics– production (magnetostriction and piezoelectric methods) and their engineering applications

3. **Light**

3.1 Laws of reflection and refraction,
3.2 Refractive index, power of lens,
3.3 Magnification of a lens
3.4 Total internal reflection and its applications, Critical angle and conditions for total internal reflection.
3.5 Simple and compound microscope, simple telescope. Magnifying power of simple telescope.
3.6 Coherent and non-coherent sources of light.
3.7 Interference of light, superposition principle, constructive &destructive interference.

Section – B : Electrical Circuits and Electromagnetism

4. **Electrostatics**

4.1 Coulombs law, unit charge.
4.2 Electric flux and Gauss's Law, Electric field intensity and electric potential at any point due to a point charge.
4.3 Capacitance, Principle of capacitor, capacitance of parallel plate capacitor, series and parallel combination of capacitors
4.4 Numerical based on combination of capacitor.

5. **DC Circuits**

5.1 Current, voltage and resistance, potential difference, Electric power, electrical energy and their units.
5.2 Ohm's law
5.3 Series and parallel combination of resistors, specific resistance, effect of temperature on resistance.
5.4 Kirchhoff's laws
5.5 Numerical based upon combination of resistances.

6. **Electromagnetism**

6.1. Magnetic field and its units
6.2. Biot-Savart Law, magnetic field around a current carrying straight conductor,
6.3. Force on a moving charge and current carrying conductor in a magnetic field.
6.4. Classification of material on the basis of magnetism(dia, para and ferromagnetic materials).

Section – C : Advanced Physics

7. **Semiconductor physics**

7.1 Energy bands, definition of conductor, semiconductor & insulator on the basis of band theory, intrinsic and extrinsic semiconductors, p-n junction diode and its characteristics
7.2 Diode as rectifier – half wave and full wave rectifier

8. **Modern Physics**

8.1 Lasers:
(i) Concept of energy levels, ionization, excitation and de-excitation of laser;
(ii) Spontaneous and stimulated emission, pumping scheme, population inversion,
(iii) Ruby, He-Ne lasers,
(iv) Applications of Laser

8.2 Fibre optics:
(i) Optical fibre and its types.
(ii) Optical fibre materials,
(iii) Acceptance angle and numerical aperture
(iv) light propagation in optical fibre
(v) Advantages of optical fibre over copper wires in communications.
(vi) Applications of optical fibre

LIST OF PRACTICALS (To perform minimum seven experiments)

1. To verify Ohm's law.
2. To verify Kirchhoff's current voltage laws.
3. To verify laws of resistances in series and in parallel
4. To convert a galvanometer into an ammeter of a given range
5. To convert a galvanometer into a voltmeter of a given range
6. To study characteristics of a P-N junction diode
7. To find the capacitance of parallel plate capacitor.
8. To find the focal length of (i) convex lens (ii) Concave mirror.
9. To find the velocity of sound wave by sonometer method.
10. To find the aperture of Plastic optical fibre by geometrical method.

RECOMMENDED BOOKS

1. *Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T*
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, Delhi*
4. *Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi*
5. *Fundamentals of Physics by Resnick, Halliday and Walker, Asian Book Pvt. Ltd., New Delhi*
6. *Berkeley Physics Course, Vol. I, II &III, Tata McGraw Hill, Delhi*
7. *The Feynman Lectures on Physics by Feynman, Leighton and Sands, Vol. I & II, Narosa Publishing House, Delhi*
8. *Fundamentals of Optics by Francis A. Jenkins & Harvey E White, McGraw Hill International Editions, Physics Series*
9. *A Text Book of Optics, Subramanian and Brij Lal, S Chand & Co., New Delhi*
10. *Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publishers*
11. *Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi*
12. *Applied Physics I & II by RA Banwait & R Dogra, Eagle Parkashan, Jalandhar*

SUGGESTIVE DISTRIBUTION OF MARKS		
Topic No.	**Time Allotted (Hrs)**	**Marks Allotted (%)**
1	10	15
2	8	10
3	9	15
4	7	10
5	6	10
6	8	15
7	6	10
8	10	15
Total	**64**	**100**

2.4 COMPUTER PROGRAMMING USING C

L	P
2	4

RATIONALE

The objectives of this course are to make the student understand programming language, programming, concepts of Loops, reading a set of Data, stepwise refinement, Functions, Control structure, Arrays. After completion of this course the student is expected to analyze the real life problem and write a program in 'C' language to solve the problem. The main emphasis of the course will be on problem solving aspect i.e. developing proper algorithms.

DETAILED CONTENTS

1. **Introduction to Programming**
   Algorithms, Flow-charts, Evolution of Programming Languages, structured Programming techniques, Compilation, Linking and Loading, Testing and Debugging, Documentation

2. **Introductions to 'C' Language**
   Character set, Identifiers, keywords, Variables, Data Types, Constants and Literals, Structure of c program, Basic input/output statement, formatted statements (Printf, Scanf) and unformatted statements (getchar, putchar, gets, puts).

3. **Operators**
   Arithmetic operators, Relational Operators, Logical Operators, Bitwise operators, assignment operators, Conditional operators, Special operators.

4. **Flow Control Statements**
   Branching statements, Conditional (if, if…else, nested if, if…else if ladder, Switch case), Unconditional (Goto, break, continue and return), Loops: while loop, do while, for loop, Nested loops, Infinite loops.

5. **Storage Classes**
   Scope and lifetime: auto, extern and static, register, volatile.

6. **Arrays**
   One dimensional arrays: Array declaration and initialization; Two dimensional arrays: Array declaration and initialization, Character array, Strings, Standard library string functions (srtlen, strrev, strcav, strcmp, srtcpy,)

7. **Functions**
   Definition, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference, call by value, Recursive Functions, arrays as function arguments

List of Practical

Note: Theory part can also be covered in practical sessions

1. **To print a message like "Hello World" on computer screen**
2. **Using variables and arithmetic operators:**
   - To perform addition, subtraction, multiplication and division operations on two integers
3. **Using unformatted I/O**
   - To use unformatted character I/O functions (getchar() and putchar())
   - To use unformatted string I/O functions (gets() and puts())

4. Using Formatted I/O

- To use scanf() function to read integers (%d, %i, %o, %u, %x), characters (%c), floating point numbers (%f, %g, %e), strings (%s, scanset)
- To use printf() function to format and print output (%d, %i, %o, %u, %x, %e, %E, %f, %g, %c, %p, %c, %s, %n)
- To change width, precision and alignment of the output of printf()

5. Using Conditional Branching

- To computer the real roots of a quadratic equation (using if statement to check for the imaginary roots
- To check whether a given integer is even or odd (if … else statement
- To write month name corresponding to a month number (switch … case)

6. Using Iterative Statements

- To check whether a given integer is prime
- To reverse the digits of a given positive integer
- To generate the multiplication table of a given integer
- To generate the first n terms of a given AP series
- To generate first n terms of Fibonacci series
- To compute factorial of a given integer

7. Using Arrays

- To compute sum of elements of a one dimensional integer array
- To find the largest element in a one dimensional array
- To search a given element in a one dimensional array
- To perform matrix addition and matrix multiplication using 2-D arrays

8. Using Strings

- To convert the alphabetic characters of a string to uppercase
- To find the length of a string
- To use Standard Library String Functions (strcat(), strrev(), strcp(), strcmp())

9. Using Pointers

- Demonstrating the use of address and dereferencing operators
- Performing pointer arithmetic to manipulate an array

10. Using Functions

- Writing a function to find sum of two integers
- Writing a function to swap value of two integers (Call by reference)
- Writing a function to compute factorial of a given integer (Recursion)

RECOMMENDED BOOKS

1. *"The C Programming Language," B.W. Kernighan & D M Ritchie, Pearson Education*
2. *"Programming with C," Byron S Gottfried Second edition, Tata McGraw Hill*
3. *"Let us C," Yashwant Kanetkar, BPB Publications*
4. *"Programming with ANSI-C," E. Balagurusamy, Tata McGraw Hill*
5. *B.W. Kernighan & D M Ritchie, "The C Programming Language, Pearson Education*
6. *Byron S Gottfried "Programming with C" Second edition, Tata McGrawhill,*
7. *Kanetkar Y, "Let us C", BPB Publications, E. Balagurusamy, "Programming with*
8. *ANSI-C", Tata McGraw Hill.*

SUGGESTED DISTRIBUTION OF MARKS		
Topic No.	**Time Allotted**	**Marks Allotted (%age)**
1	**03**	**06**
2	**05**	**15**
3	**04**	**12**
4	**06**	**20**
5	**03**	**05**
6	**05**	**20**
7	**06**	**22**
Total	**32**	**100**

2.5 ENVIRONMENTAL STUDIES & DISASTER MANAGEMENT

L	P
3	-

RATIONALE

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 ecosystem and controlling pollution by various control measures. He should also be aware of environmental laws related to the control of pollution. He should know how to manage the waste. Energy conservation is the need of hour. He should know the concept of energy management and its conservation.

DETAILED CONTENTS

1. Basics of ecology, eco system and sustainable development

2. Conservation of land, preservation of species, prevention of advancement of deserts and lowering of water-table, rain water harvesting, deforestation – its effects and control measures

3. Pollution: Sources of pollution - causes, effects and control measures of pollution (air, water, noise, soil, radioactive and nuclear). Units of measurement. Prevention of Pollution, Introduction to Cleaner Production Technologies, Introduction to Waste Minimization Techniques

4. Solid waste management, classification of refuse material, sources, effects and control measures. Introduction to E-waste Management

5. Energy Conservation: Introduction to Energy Management, Energy Conservation, Energy efficiency & its need. Introduction to Energy Conservation Act 2001 and Energy Conservation (Amendment) Act 2010 & its importance. Role of Non-Conventional Energy Resources (Solar Energy, Wind Energy, Bio Energy, Hydro Energy) in environmental protection.

6. Impact of Energy Usage on Environment: – Global Warming, Green House Effect, Depletion of Ozone Layer, Acid Rain. Eco-friendly Material, Recycling of Material, Concept of Green Buildings.

7. Basics of Disaster Management
   - 7.1 Disasters- Basic Terminology: Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity – Disaster and Development, and Disaster Management.
   - 7.2 Types, Trends, Causes, Consequences and Control of Disaster

     Geological Disasters: earthquakes, landslides, tsunami, mining;

     Hydro-Meteorological Disasters: floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves.

     Disasters: epidemics, pest attacks, forest fire;

     Technological Disasters: chemical, industrial, radiological, nuclear;

     Manmade Disasters: building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters.

     Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters
   - 7.3 Disaster Management

     Disaster Management, Disaster risk reduction

     Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zoning and Micro-zoning

     Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development;

RECOMMENDED BOOKS

1. Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.
2. Environmental Protection Law and Policy in India by Thakur Kailash; Deep and Deep Publications, New Delhi.
3. Environmental Pollution by Dr. RK Khitoliya; S Chand Publishing, New Delhi
4. Environmental Science by Deswal and Deswal; Dhanpat Rai and Co. (P) Ltd. Delhi.
5. Environmental Studies by Dr. MP Poonia & Prof. SC Sharma, Khanna Book Publishing Co. (P) Ltd. New Delhi.
6. Environmental Studies by Erach Bharucha; University Press (India) Private Ltd., Hyderabad.
7. Environmental Engineering and Management by Suresh K Dhameja; SK Kataria and Sons, New Delhi.
8. http://nidm.gov.in/tdesigns.asp
9. http://hppcb.nic.in

SUGGESTED DISTRIBUTION OF MARKS		
Topic No.	**Time Allotted (Hrs)**	**Marks Allotted (%)**
1	02	05
2	04	10
3	10	20
4	06	10
5	08	20
6	06	10
7	12	25
Total	**48**	**100**

2.6 ENGINEERING DRAWING - II

L	P
-	6

RATIONALE

Drawing is the language of Engineers and Technicians. Reading and interpreting Engineering Drawing is their day-to-day responsibility. The subject is aimed at developing basic graphic skills in the students 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 following BIS SP 46 – 1988.

Note:

1) First angle projection is to be followed.
2) Minimum 16 sheets to be prepared. At least 2 sheets in AutoCAD.
3) Instructions relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students.
4) Continuous evaluation be done by the teachers for exercises/work done on CAD software. For this proper record may be maintained for its inclusion in the internal assessment.

DETAILED CONTENTS

1. Detail and Assembly Drawing (02 sheets)

Principle and utility of detail and assembly drawings

1.1 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 Mortice and Tenon joint, furniture drawing - freehand and with the help of drawing instruments.

2. Screw Threads (03 sheets)

2.1 Thread Terms and Nomenclature

2.1.1 Types of threads-External and Internal threads, Right and Left hand threads (Actual and Conventional representation), single and multiple start threads.

2.1.2 Different Forms of screw threads-V threads (B.S.W threads, B.A thread, American National and Metric thread), Square threads (square, Acme, Buttress and Knuckle thread)

3. Nuts and Bolts (02 sheets)

3.1 Different views of hexagonal and square nuts. Square and hexagonal headed bolt

3.2 Assembly of Hexagonal headed bolt and Hexagonal nut with washer.

3.3 Assembly of square headed bolt with hexagonal and with washer.

4. Locking Devices (02 sheets)

4.1 Different types of locking devices-Lock nut, castle nut, split pin nut, locking plate, slotted nut and spring washer.

4.2 Foundations bolts-Rag bolt, Lewis bolt, curved bolt and eye bolt.

4.3 Drawing of various types of studs

5. Keys and Cotters (02 sheets)

5.1 Various types of keys and cotters - their practical application, drawings of various keys and cotters showing keys and cotters in position

5.2 Various types of joints

- Spigot and socket joint
- Gib and cotter joint
- Knuckle joint

6. Rivets and Riveted Joints (03 sheets)

6.1 Types of general purpose-rivets heads

6.2 Caulking and fullering of riveted joints

6.3 Types of riveted joints

(i) Lap joint-Single riveted, double riveted (chain and zig-zag type)

(ii) Single riveted, Single cover plate butt joint

(iii) Single riveted, double cover plate butt joint
(iv) Double riveted, double cover plate butt joint(chain and zig-zag type)

7. Couplings (02 sheets)

7.1 Introduction to coupling, their use and types
7.2 Flange coupling (protected)
7.3 Flexible Coupling

8. Use of CAD software* (03 sheets)

Draw any two joints/coupling using CAD software from the following:

i) Sleeve and cotter joint
ii) Knuckle joint
iii) Spigot and socket joint
iv) Gib and cotter joint
v) Flange coupling
vi) Muff coupling

*** Auto CAD drawing will be evaluated internally by sessional marks and not by final theory paper.**

RECOMMENDED BOOKS

1. A Text Book of Engineering Drawing by Surjit Singh; Dhanpat Rai & Co., Delhi
2. Engineering Drawing by PS Gill; SK Kataria & Sons, New Delhi
3. Elementary Engineering Drawing in First Angle Projection by ND Bhatt; Charotar Publishing House (Pvt. Ltd.), Anand
4. Engineering Drawing I & II by JS Layall; Eagle Parkashan, Jalandhar
5. AutoCAD 2010: For Engineers & Designers by Prof. Sham Tickoo & D. Sarvanan; Wiley India Pvt. Ltd., Delhi.

2.7 GENERAL WORKSHOP PRACTICE - II

L	P
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RATIONALE

Psychomotor skills are mastered through practice, an opportunity therefore, has been extended to students through this course to refine their skills in different trades. The basic skills developed during first semester will be refined during this course by doing higher order skills jobs. In addition to developing general manual and machining skills in the students, the objective of development of sense of dignity of labour, precision, safety at work places, team working and right attitude among the students will also be met.

DETAILED CONTENTS (PRACTICAL EXERCISES)

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 Welding Shop – II
2 Fitting Shop – II
3 Sheet Metal Shop – II
4 Electric Shop -II
5 Electronics Shop
6 Computer Shop

1. WELDING SHOP - II

1.1 Introduction to gas welding, gas welding equipment, introduction to soldering and brazing, introduction to resistance welding, safety precautions.

1.2 Jobs to be prepared

Job I Identification and adjustment of various types of gas flames.
Job II Preparation of lap joint on 75 mm × 35 mm × 3mm M.S. plate using gas welding.
Job III Preparation of butt joint on 75mm×35mm×3mm M.S.flat using gas welding process.
Job IV Preparation of a small cot frame (M.S. steel bed frame) from M.S. conduit pipe using arc/gas welding process.
Job V Preparation of a square pyramid from M.S. rod by welding (Arc or Gas welding).
Job VI Practice on Spot/Seam welding.

2. FITTING SHOP - II

2.1 Care and maintenance of various measuring tools.
2.2 Handling of measuring instruments, finding least count and checking of zero error.
2.3 Description and demonstration of various types of drills, taps and dies.
2.4 Selection of dies for threading, selection of drills and taps.
2.5 Precautions while drilling soft metals (Aluminium, Copper, Brass etc.).
2.6 Introduction to various types of threads (internal, external, single start, multi-start, left hand and right hand threads).

Job I Drilling practice on soft metals-Aluminium or Copper or Bronze.
Job II Preparation of a job by filing on non ferrous metals upto an accuracy of ± .1 mm.

Job III Making internal and external threads on a job (GI Pipe, PVC pipe, Steel bars etc.) by tapping and dieing operations (manually) and fixing of different types of elbow, tee, union, socket.

3. SHEET METAL SHOP - II

3.1 Introduction to various metal forming processes e.g. Spinning, Punching, Blanking, cup drawing
3.2 Introduction to soldering and brazing.
3.3 Introduction to metal spinning process.

Job I Preparation of job involving shearing, circular shearing, rolling, folding, beading and soldering process e.g. Funnel or any other job involving above operations.
Job II Exercise on job involving brazing process
Job III Spinning a bowl/cup/saucer
Job IV Visit to a sheet metal industry e.g. coach builders etc.

4. ELECTRIC SHOP - II

4.1 Introduction to single phase and three phase supply and wiring system. Importance of three phase supply and wiring system.
Job I Laying 3 phase wiring for an electric motor or any three phase machine.
4.2 Estimating and costing of power consumption
Job II Connecting single phase energy meter with supply and load. Reading and working out power consumption and cost of energy.
Job III Finding faults in electric circuits, machines, with series testing lamp and multimeter.
4.3 Demonstration of dismantling, servicing and reassembling of table/ceiling fan, air-cooler, auto electric iron, heater etc.
Job IV Dismantling, servicing and reassembling of any of the above electrical appliances.
4.4 Testing and reversing direction of rotation of single phase and three phase motors.
Job V Testing single phase/three phase motors by using voltmeter, ammeter and tachometer.
Job VI Reversing direction of rotation of single phase and three phase motors.
4.5 Identification and familiarization with the following tools:
Tweezers, Screw Drivers (Different sizes), Insulated pliers, Cutters, Sniper, Philips Screw driver (star screw driver), L-Keys, Soldering Iron and their demonstration and uses.
Job VII Practice on joining using soldering and removing components/wires by desoldering

5. ELECTRONICS SHOP

5.1 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 ouput
5.2 Identification and familiarisation with active and passive components; colour code and types of resistor, capacitors and potentiometers (including VDR, LDR, and thermistor). Identification of components including LED, LCD, UJT, FET, Coils, transformers (mains, audio and RF, etc.), MOSFET, SCR, DIAC, TRIAC, Photodiode and Photo transistor.
5.3 Job Practice
Job I Use of multimeters to test components and measurement of circuits, voltage, resistance.
Job II Use of familiarisation with CRO, signal generator, function generator and Audio oscillator.
Job III To make regulated power supply on general purpose PCB.
Job IV Identification and familiarisation of datasheets of the following components: UJT, FET, MOSFET, SCR, DIAC, TRIAC, Photodiode and Photo transistor.
Job V Safety precautions to be observed in the electronic shop.

6. COMPUTER SHOP

EXERCISE - I

6.1 Optical Devices

- CD-R, DVD, CD-W
- Working
- Copying
- CD/DVD drives
- Pen drive (copying data, formatting, scanning)

6.2 Microphones and Speakers

- Types and Interfacing

EXERCISE – II

6.3 Projectors

- Types
- Settings
- Interfacing

6.4 Hard disks

- Different makes of Hard disks, installation
- Retrieval of Hard disk data

6.5 Graphic Card connection

6.6 Sound Card Connection

EXERCISE – III

6.7 Different types of network interface cards, cables such as data cables, printer cables, network cables, power cables etc.

6.8 Networking tools such as cutter, connector (RJ45)

6.9 Network Cable

- Straight Cable
- Cross Cable
- Roll Cable

EXERCISE – IV

6.10 Types of cables

- UTP Cables: CAT3, CAT5, CAT6, CAT7
- Fibre optic cable
- Structured cabling

RECOMMENDED BOOKS

1. Workshop Technology I,II,III, by SK Hajra, Choudhary and AK Choudhary; Media Promoters and Publishers Pvt. Ltd. Mumbai.
2. Workshop Technology Vol. I, II, III by Manchanda; India Publishing House, Jalandhar.
3. Workshop Training Manual Vol. I, II by S.S. Ubhi; Katson Publishers, Ludhiana.
4. Manual on Workshop Practice by K Venkata Reddy; MacMillan India Ltd., New Delhi
5. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
6. Workshop Technology by B.S. Raghuwanshi; Dhanpat Rai and Co., New Delhi
7. Workshop Technology by HS Bawa; Tata McGraw Hill Publishers, New Delhi
8. Computer Networks by A.S. Tanenbaum, Pearson Publishers, New Delhi