

101 COMMUNICATION SKILLS-I

Teaching & Examination Scheme

Teaching Scheme			Examination Scheme					
L	T	P	Exam. Hour	Theory	Practical	Oral	Terminal & Assessment	Total
3	0	2	03	80	0	0	20	100

RATIONALE:

English is the most versatile international language what we follow and the fact that most of the books in engineering field are available in English only, it becomes necessary to build foundation of English language. More over, English is not our mother tongue, nor most of us live in an atmosphere of English. In schools you read English as a subject and the main reason behind your reading, for many of you, was simply to pass examination.

Now, in your job-oriented education, you find that you need to learn English not as a subject but as a service language- serving as a vehicle for your educational as well as professional needs. There is need for communication. For example, when you are reading a text book/reference book on engineering in English, you are, in fact, sharing information with the writer. Sometimes, you may disagree too. In a way, you are communicating with the writer. Similarly, when you are writing an examination in the language you are, in fact, communicating with your reader, that is, the examiner. You are trying to expose your feelings and ideas in such a way that they become understandable, meaningful and convincing to him. Or, when you are listening to a class lecture you are also sharing information with your teacher. You understand and assimilate his points and take notes in your own way. When there is any confusion, you ask, understand and clarify.

In your post study vis-à-vis professional life, you need to work effectively and efficiently with the language. When you write a job application, you try to put your best self forward to the prospective employer so that he feels an urge to dispatch an interview letter. Your communication becomes successful. Your ultimate success comes when you win over the Board in the job interview by good communication in English. After getting the job, you do a lot of communication in English, such as, you write reports, read instructions and manuals for setting up a machine perfectly and speak to clients for more orders.

Thus you feel, there is a gulf of difference between the purposes for which you read English at school and for which you are reading now. With globalization, improvements in science and technology, and technology transfer, the demand of communication in English is growing. If you have to be successful in life you need to develop your communication skills in English along with the development of your technological skills. By skill we mean the knowledge and ability that enable you to do something well and for that you require training.

Moreover, there is constant need of garnishing communication skills in English. For this very purpose students are expected to avail themselves with knowledge and facility of classroom and the English lab.

AIM:

To develop Listening Skills, Speaking Skills, Reading Skills, Writing Skills, Group Discussion, Debate and our self skills by using in speaking, reading and writing.

TOPICS:

1. Grammar

Portions to be covered in English Grammar

1. Parts of speech
2. Subject-Verb agreement
3. Tense- Present, Past, Future
4. Articles
5. Preposition
6. Modals-making polite statements

2. **Punctuation** : Full stop, comma, semi-column, inverted commas, note of interrogation.
3. **Vocabulary**: Word power up to at least 2000- Technical, Semi-technical and general. Word Formation, One Word Substitutions, Antonyms and Synonyms
4. **Reading-I** : Special emphasis on reading text book of the syllabus under the supervision of faculty.
5. **Listening-I** : Listening skills to be developed in students for general understanding of language and various other functions-like to take class notes and key lexical items. For this purpose the English lab should be provided for Audio-Visual and Video facilities.
6. **Speaking-I** : Students should be encouraged to speak, so that they can develop confidence and their personality.
7. **Writing- I** : Since writing is an important skill. So, the students should develop power of writing skills for general and examination purpose as well.

Text Books

1. Communication in English For Technical Students
By Orient Longman (For Listening Skills and Reading Skills)
2. Spoken English (A self learning guide to conversation Practice)
By V. Sasikumar & P.V. Dhamija
Publisher – Tata McGraw-Hill Publishing Company Ltd. New Delhi.
3. A Hand Book of Pronunciation of English words
Publisher - Tata McGraw-Hill Publishing Company Ltd. New Delhi.

References Books :

1. English for specific purposes : A learning-centred approach; Hutchinson, Tom and Waters, A Ian CUP 1987.
2. The Second language curriculum- Ed. Robert Keith Johnson; CUP 1989
3. Designing tasks for the communicative classroom-David Nunan; CUP 1989
4. Writing English language tests-J.B. Heaton; Longman Group U K Limited 1988
5. Testing for language teachers-Arthur Hughes; CUP 1989

6. Writing matters-Kristine Brown & Susan Hood; CUP 1989
7. Communicate 2 -Keith Morrow & Keith Johnson; CUP 1980
8. In at the deep end- Vicki & Hollett; OUP 1989
9. Teaching the spoken language-G.Brown and G. Yule; CUP 1983
10. Teaching reading skills in a foreign language-Christine Nuttall; Heinemann 1982
11. Communication in English for technical students-Orient Longman 1984
12. Teachers manual for communication in English for technical students-Curriculum Development Centre, Technical Teachers' Training Institute, (ER); Orient Longman 1984
13. How to write correct English by R. P. Sinha
14. English Grammar by J. Nesfield
15. Intermediate English Practice Book by S. Pit Corder (Orient Longman)
16. Advance Learner's Dictionary by A.S. Hornby

102. ENGINEERING MATHEMATICS- I

Teaching & Examination Scheme

Teaching Scheme			Examination Scheme					
L	T	P	Exam. Hour	Theory	Practical	Oral	Terminal & Assessment	Total
4	0	0	03	80	0	0	20	100

Notes:

- This subject is common for all courses.
- Duration of the course is of 16 weeks.
- Two terminal examinations each of 10 marks is to be conducted as per schedule given by SBTE.
- Total of terminal marks are to be converted out of 20 and to be entered in mark sheet under the head Terminals.

RATIONALE:

Mathematics lay down the foundation for understanding the core technology and Engineering disciplines. In this subject, we intend to teach students basic facts, concepts and principles of Mathematics as a tool to analyse Engineering problems.

OBJECTIVES:

This subject helps the students to develop logical thinking which is useful in comprehending the principle of all other subjects. Analytical and systematic approach towards any problem is developed through learning of this subject. Mathematics being a versatile subject can be used at every stage of life.

AIM:

To understand the techniques and methods for solving Engineering Problems, such as Simultaneous equations involved in vibrations, Electrical Circuits, Laws of Frictions, Projections, Lami's Theorem, Stress- strain curves etc.

Contents: Theory

Chapter	Contents	Hours	Marks
1. ALGEBRA:		20	40
1.1	Prerequisites : Ratio, Proportion, Variation	01	

1.2	Partial Fraction: Resolution into Partial Fraction of i) Non repeated Linear factors and repeated linear factors, ii) Non repeated Quadratic factors.	02	
1.3	Progression: Idea of Sequence and Progression, A.P, G.P and H.P. A.M, G.M and H.M and their relation. Sum to n terms of A.P. and G.P. Sum of infinite terms of a G.P. Sum of squares and cubes of naturals.	04	
1.4	Exponential and Logarithmic series and direct application to problems.	02	
1.5	Permutations & Combinations: Meaning of Factorial Notation, ${}^n C_r$, ${}^n P_r$. Simple Practical Problems on these and important identities.	04	
1.6	Binomial Theorem: Binomial expansion for positive index, general term, middle term, greatest term and related simple problems.	03	
1.7	Complex numbers: Definition of complex numbers, Argand diagram, conjugate, Modulus and argument, polar form of complex numbers. Cube roots of unity and their properties, De-Moiver's theorem (without proof) and related problems.	04	
2. Trigonometry:		14	20
2.1	Introduction to Measurements of Angles, Definition of Radians, Relation between Degree & Radians.	01	
2.2	Trigonometrical Ratios of acute angles. Compound, Multiple and Sub multiple Angles.	03	
2.3	Identities, Trigonometric equations and their solutions.	03	
2.4	Concept of Inverse Circular Functions, solutions of simple problems	02	
2.5	Properties of Triangle, Derivation of Sine, Cosine and Tangent formulae.	03	
2.6	Logarithm:	02	

	Definitions, Elementary Propositions with simple examples. Common Logarithm, Determination of Characteristics and Mantissa		
3. Coordinate Geometry		11	20
3.1	Concept of Cartesian and Polar Coordinates System,	01	
3.2	Distance Formula, Section Formula, Area of Triangle, Relevant examples.	02	
3.3	Locus of a curve General equation of Straight Lines, Standard forms, Angle between two lines, Length of Perpendicular, Equations of Parallel and Perpendicular lines.	05	
3.4	Equation of Pair of straight lines, Angle between them,	01	
3.4	General and standard Equation of circle, circle through three points, circle with a given diameter. Suitable examples	02	
TOTAL:		45	80

Text Books

- Books: 1). Senior Secondary School Mathematics -R.S. Agarwal
2). A Text Book of Algebra -K.C.Sinha
3). A Text Book of Trigonometry -K.C.Sinha
4). A Text Book of Coordinate Geometry -K.C.Sinha
5). Higher Algebra -Hall & Knight
6). Engineering Mathematics -Dr. Manoj Kumar (Under Press)

103 ENGINEERING PHYSICS – I

Teaching & Examination Scheme

Teaching Scheme			Examination Scheme					
L	T	P	Exam. Hour	Theory	Practical	Oral	Terminal & Assessment	Total
3	0	0	03	80	0	0	20	100

RATIONALE:

Engineering Physics always remains an important subject in technician education, as most of the topics are deprivities of physics only. Laws and principles of physics are involved fields of engineering. Every instrument and machine is inherently based on some principles of physics only. This necessitates the basic knowledge of Units and Measurements, Mechanics of Materials, Properties of Matters, Heat and Sound in technician education.

AIM:

Appropriate courses of study selected from relevant fields of Engineering Physics have been included in order to reinforce the fundamental concepts of engineering applications for the technicians to satisfy the under mentioned aim:-

- To develop skills in Units and Measurements, Mechanics of Materials, Properties of Matters, Heat and Sound

TOPICS / SUB TOPICS

1.0 Units, Dimension and Measurements : (2)

1.1 Units, Dimension

- Concept of unit of physical parameters
- Fundamental and derived units
- SI systems of units of different physical parameters
- Dimension with examples of different physical parameters.

2.0 Mechanics (10)

2.1 Motion along a straight line and Force

- Concept of scalar and vector quantities
- Equations of motion with constant acceleration (derivation not required)
- Equations of motion of falling body under gravity
- Simple problems on linear motion
- Newton's laws of motion, Action and reaction, tension
- Force, inertia, momentum, impulse and impulsive force with practical examples (basic Idia)
- Conservation of linear momentum.

3.0 Gravitation: (5)

- Newton's laws of gravitation
- Newton's gravitational constant (G) and its SI unit
- Acceleration due to gravity (g) and its relation with "G".
- Variation of g with altitude and latitude (deduction not required)
- Simple problems

4.0 Work, Power and Energy (Review) (5)

- Work, power and energy with their units and mathematical expressions
- Relation between Horse power and Watt
- Different forms of mechanical energy : PE, KE and their expressions (derivation)
- Conservation of energy and transformation of energy with examples
- Simple problems

5.0 Properties of matter : (6)

5.1 Properties of solid (3)

- Plasticity and elasticity in solids
- Deformation of bodies by the action of external forces - change in size and change in shape
- Unit of stress – tensile stress, compressive stress and Shear stress with examples
- Unit of strain – tensile strain., volumetric strain and shear strain
- Hooke's law
- Modulus of elasticity – Young's modulus, Bulk modulus and Modulus of rigidity. Poisson's ratio and their units
- Stress – Strain curve

5.2 Properties of Fluid (3)

- Streamline and turbulent flow of fluid
- Co-efficient of viscosity
- Critical velocity and its derivation
- Stoke's formula and Reynolds's number

6.0 Heat (10)

6.1 Heat and temperature (Review) (2)

- Heat and temperature
- Fixed points and different scales of temperature - Fahrenheit, Celsius and Kelvin and their relationships

6.2 Measurement of heat (4)

- Quantity of heat, units of heat-Joule and Calorie
- Specific heat of solid, heat capacity, water equivalent
- Principle of calorimeter, Measurement of specific heat
- Change of state : Latent heat, evaporation & boiling, effect of pressure

- Idea of two specific heat capacities of gas: C_p and C_v and their relationships
- Simple problems

6.3 Thermal expansion & Transmission of heat (4)

- Expansion of solid – linear, superficial and Cubical co-efficient of expansion & their units
- Different modes of transmission of heat : conduction, convection and radiation , steady state of temperature condition
- Co-efficient of thermal conductivity & its unit
- Good conductors and bad conductors of heat
- Simple problems

7.0 Sound : (7)

7.1 Simple Harmonic Motion (3)

- Simple harmonic motion and its characteristics
- Time period, frequency & amplitude of vibration
- Mathematical expression of SHM
- Examples of SHM: Simple Pendulum (derivation not required)
- Simple problems

7.2 Production and propagation of Sound (2)

- Natural vibration, forced vibration with examples
- Resonance of sound with examples
- Principle of resonance to find out velocity of Sound in air.
- Velocity of sound , Newton's formula and Laplace correction (Idea only, no deduction)
- Introduction to Ultrasound

7.3 Reflection of sound (2)

- Echo, reverberation and reverberation time
- Acoustics of buildings, absorption power of a surface

Text Books :

1. Engineering Physics - R.K. Gaur, S.L. Gupta
2. Physics for Engineers - M.R Srinivasan
3. A text book of Physics – C. R. Dasgupta Part I & II
4. Elements of Higher Secondary Physics (Part I & II)
— D. Dutta, B. Pal & B. Chaudhuri
5. Physics Vol. I, II – H. C Verma
6. Pradeep's Fundamental of Physics Vol I & II – KL Ghambhir & KL Gogia
7. Comprehensive Physics - - Narindra Kumar

104 ENGINEERING CHEMISTRY-1

Teaching & Examination Scheme

Teaching Scheme			Examination Scheme					
L	T	P	Exam. Hour	Theory	Practical	Oral	Terminal & Assessment	Total
3	0	0	03	80	0	0	20	100

RATIONALE:

Engineering Chemistry is an important subject in technician education, because of the fact that fundamental knowledge and skills in respect of physical and chemical characteristics of matters related to solid, liquid and gas are essential elements on which various aspects of application in engineering depend upon.

AIM:

Appropriate courses of study selected from relevant fields of Engineering Chemistry have been included in order to reinforce the fundamental concepts of engineering applications for the technicians to satisfy the following aims:

- To develop fundamental knowledge and skills related to chemical properties of matters in general, such as solid, liquid and gas, and their appropriate applications in engineering disciplines, which include General (Physical) Chemistry Electro-chemistry, Metallurgy, Corrosion, Protective Coatings and Plastic & Polymer .

TOPICS / SUB TOPICS

1.0 General Chemistry (14)

1.1 Atomic Structure (5)

- An overview with respect to atomic models, electronic configuration & principles involved there in.
- Concept of various kinds of bonding and their properties.
- Mole concept /Avagadro's No.'s and related numerical

1.2 Solution (5)

- Unit of solution and their application in Titration with the use of indicators.
- Solubility products and their application in precipitation / salting out of soap and in Quantitative analysis.
- Buffer Solution - Numericals

1.3 Colloids (4)

- Introduction, classification and properties
- Application of colloid in Environmental, Agriculture and food industries
- Emulsions

2.0 Chemical Kinetics & Chemical Equilibrium (5)

- Rate of reactions and factors effecting rate of rk
- Concept of Chemical Equilibrium, Equilibrium Constant
- Relation between K_c , K_p & K_x
- Lechatelier's Principle

3.0 Electrochemistry (4)

- Introduction to Electrolytes, Electrolysis, Faraday's Law of Electorlysis and its applications specially in Electroplating
- Electrochemical Cell (Galvanic cell) and Cell reactions
- Electrodes and Electrode potential

4.0 Metallurgy (4)

- Mineral and ores
- Operation involved in Extraction of Metal From Ores
- Important alloys and its applications (Steel, Brass & Bronze)

5.0 Corrosion and Protective Coatings: (5)

- Introduction, Kinds, causes and effect of corrosion
- Protective Measures against corrosion
- Paints

6.0 Polymers & Plastics: (4)

- Concept of Polymer & Plastics
- Kinds, Properties and uses of Plastics
- Manufacturing methods of Plastics

7.0. Biotechnology (4)

- Introduction & development of Biotechnology,
- Scope, impotence and application of Biotechnology

Text Books:

1. Environmental Chemistry by A K Dey
2. Engineering Chemistry : Jain & Jain
3. Engg Chemistry - Kataria Sons Publications
4. Engg Chemistry – Uppal

105/109 ENGINEERING DRAWING

Teaching & Examination Scheme

Teaching Scheme			Examination Scheme					
L	T	P	Exam. Hour	Theory	Practical	Oral	Terminal & Assessment	Total
3	0	6	04	80	40	0	20 / 10	150

RATIONALE :

Engineering Drawing is the language of Engineers and is a precise means of communicating the ideas of the engineer, designer, architect to the workmen who will produce/build the desired object. It is necessary that all diploma engineers have command over making and reading of engineering drawing and have thorough understanding of geometric principles of orthographic projection upon which engineering drawing is based.

AIMS :

- Read and interpret common engineering drawings
- Translate the geometrical features of real objects into engineering drawings and conceive the features of a real object from its engineering drawings.

TOPICS / SUB TOPICS

1. Demonstration of the use of drawing board, T-square, Mini Drafter, Set square, Compass, Scale, Protractor and drawing sheets of the different sizes as per IS standards (IS 10711: 1983 Bureau of Indian Standards) convention for various material IS 696-1972 **(10)**
2. Lettering and dimensioning, Projection of points, Introduction of lines, Projection of straight lines, Projection of planes, Projection on auxiliary planes Construction of Ellipse, Parabola, Hyperbola by General and Rectangular Method. **(35)**
3. Projection of solids, Section of solids, Intersection of Surfaces, Development of surfaces, Isometric Projections, Conversion of pictorial view into -Orthographic views, sectional views. **(40)**
4. Building Drawing (Plan of workshop or lab with doors and windows) **(5)**

IS CODE:

1. IS 9609: 1990 Bureau of Indian Standards
2. IS 11669: 1986 Bureau of Indian Standards
3. IS 10713:1983 Bureau of Indian Standards
4. IS 11065 (Part I): 1984 Bureau of Indian Standards
5. IS 10711: 1983 Bureau of Indian Standards
6. IS 11665: 1985 Bureau of Indian Standards

7. IS 10714: 1983 Bureau of Indian Standards
8. SP 46:1988 Bureau of Indian Standards

Text Books:

1. Engineering Drawing (Plane and solid geometry) N.D. Bhatt
2. Engineering Drawing by S.C.Sharma
3. First year Engineering Drawing by Parkinson & Sinha
4. Machine Drawing by N.D. Bhatt
5. Geometrical Engg Drawing by Abbott

106 ENGINEERING PHYSICS LAB

Teaching & Examination Scheme

Teaching Scheme			Examination Scheme					
L	T	P	Exam. Hour	Theory	Practical	Oral	Terminal & Assessment	Total
0	0	2	03	00	40	0	10	50

RATIONALE & OBJECTIVE:

The Physics Laboratory Practical has been introduced in the syllabus with a view to develop scientific attitude and skill among the students. It will help them apply the knowledge of Physics in their world of work where basic skill of observation to distinguish, differentiate and measurement of Physical objects & their properties, is required.

LIST OF EXPERIMENTS:

1. Determination of diameter and volume of a cylinder using slide calipers.
2. Determination of radius of a wire using screw gauge
3. Determination of thickness of a glass piece using spherometer
4. Determination of value of acceleration due to gravity using a simple pendulum
5. Determination of Young's modulus of elasticity of the material of a wire using Vernier apparatus.
6. Determination of thermal conductivity of the material of a rod using Searle's Apparatus
7. Determination of specific latent heat of vaporization of water
8. Determination of velocity of sound in air by resonance column apparatus.

TEXT BOOKS :

1. Inter Practical Physics by **Durga Prasad Singh**
2. Inter Practical Physics by **N. N. Ghosh**

106 ENGINEERING CHEMISTRY LAB

Teaching & Examination Scheme

Teaching Scheme			Examination Scheme					
L	T	P	Exam. Hour	Theory	Practical	Oral	Terminal & Assessment	Total
00	00	2	03	00	40	00	10	50

RATIONALE :

Engineering Chemistry practical Diploma in Engineering is to develop scientific attitude to improve the accuracy in the result. This will also help them to solve the Engineering Problems in the real work place.

AIM :

To develop diploma engineers well acquainted with the skill to face the problem at real work place.

- 1. Libation: (5)**
 - 1.1 Preparation of N/10 solution of Oxalic Acid
 - 1.2 Preparation of N/10 solution of Sodium Carbonate
 - 1.3 Preparation of N/10 (HCl), N/10 (H₂SO₄)
 - 1.4 Preparation of N/10 KOH, N/10 NaOH
 - 1.5 Preparation of N/10 KOH, N/10 (NH₄OH)
- 2. Buffer Solution: (5)**
 - 2.1 To prepare the buffer solution of NH₄Cl & NH₄OH
 - 2.2 To prepare the buffer of Acetic Acid and ammonium acetate
 - 2.3 Measurement of P^H of buffer solution by P^H meter
 - 2.4 Measurement fo P^H of drinking water by P^H meter
- 3. Quantitative Analysis: (5)**
 - 3.1 To determine the percentage of Moisture in a given sample of Coal
 - 3.2 Determination of percentage of Calcium or Calcium Carbonate from supplied Sample of CaCO₃
- 4. Qualitative Analysis: (10)**
 - 4.1 Identify the Acid radicals in given sample (Cl⁻, Br⁻, I⁻, NO₃⁻, SO₄⁻)

108 WORKSHOP PRACTICE

Teaching & Examination Scheme

Teaching Scheme			Examination Scheme					
L	T	P	Exam. Hour	Theory	Practical	Oral	Terminal & Assessment	Total
00	00	06	06	00	80	00	20	100

1. **Safety precaution and familiarization of tools:** (3 x 2 = 6 Hrs)
(Importance, General safety precautions on different shop floors. Personal, tools and general safety)
2. **Familiarization with measuring tools.** (3 x 3 = 9 Hrs)
3. **Wood Working (Carpentry section) :** (3 x 5 = 15 Hrs)
use of hand tools for holding drilling, cutting, marking & mixed tools such as vice, clamps, saw, hammers, mallet, etc. Different carpenter joints & them application. Identification of joint in a particular job article of furniture items use of speed latter.
4. **Fitting Section :** (3 x 5 = 15 Hrs)
Importance of fitting operation such as chipping, sawing, filing, scraping, drilling, seaming. Functions, classification of tools, work holding and clamping specific tools for example file, vices, chisel etc.
5. **Welding :** (3 x 5 = 15 Hrs)
Familiarization with different brazing and solding tools and materials. To make practice to joining using above methods.
6. **Sheet metal works :** (3 x 4 = 12 Hrs)
Introduction to sheet metal procedure and safety precaution, acquaintance with sheet metal tools and their safe use.
Simple development and cutting of Sheet, Making, Filling, & finishing.
7. **Plumbing :** (3 x 1 = 3 Hrs)
Introduction to various types of joints used in plumbing work & thread making.
