TECHNO INDIA UNIVERSITY
WESTBENGAL

EM 4, Sector V, Salt Lake, Kolkata-700091, West Bengal, India
Phone: +91 9836544416/17/18/19, Fax: +91 33 2357 1097

3-Year Diploma Engineering Curriculum and Syllabus for Computer Science & Engineering (CSE)

First Semester

Course Code	Course Title	Contact Hrs. / Week			Credit
		L	T	P	
Theory					
TIUBSD-101	Career Advancement - Skill Development – I	1	1	0	2
TIUBFY-102	English Language & Communication	1	1	0	2
TIUBSM-103	Mathematics-I	3	1	0	4
TIUBSP-104	Physics-I	2	1	0	3
TIUBSC-105	Chemistry-I	2	1	0	3
TIUBPM-106	Engineering Mechanics-I	3	1	0	4
Practical					
TIUBSP-194	Physics Lab	0	0	3	2
TIUBSC-195	Chemistry Lab	0	0	3	2
TIUBPH-196	Technical Drawing	0	0	3	2
Sessional					
TIUCSL-114	Entrepreneurship Skill Development-I	0	0	4	4
Total Credits					28

Approved By:
External Expert VC Registrar Dean of Academics Mentor of the Deptt. HOD

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Syllabus

1st Semester

CAREER ADVANCEMENT SKILL DEVELOPMENT

TIUBSD-101

: 1-1-0 **Credit: 2**

Module 1:

- **Basics Of Computer Networking & Internet**
  - Introduction to Networking & network model.
  - LAN, MAN, WAN.
  - Topologies of LAN.
  - Ethernet, Token Ring.
  - Networking Devices.
  - Introduction to Internet. (WWW, URL, BROWSER, HTTP, DNS, IPV4 ADDRESS, EMAIL)

- **Network Security & Threats**
  - Virus, Worm, Trojan Horse, Anti-Virus, Firewall
  - Authentication and Authorization
  - Digital Signature

- **Web Application Designing**
  - Html5
  - Client-End Validation (Javascript)
  - Website designing using Dreamweaver Cs6 Application S/W

Module 2: How to Crack Campus Interview

- Soft Skills
- Important skills applicable to the world of work

Module 3: GRE, GMAT, TOEFL

- **GRE:**
  - GRE Sentence Completion
  - GRE Analogies

- **GMAT:**
  - GMAT Diagnostic Test
  - Math Review

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- **TOEFL:**
  - Questions & Answers relating to the TOEFL.
  - Review of Listening Comprehension.

Module 4:

- **Entrepreneurship & Scale of Industries**
  - Product market
  - Main characteristics of Entrepreneur
  - Entrepreneurship & Economic development
  - The role of small and medium scale industries in Indian economy
  - Types of finance required for setting small & medium scale industries

- **Business Opportunities & Government Policies**
  - The nature and character of different economic activities related to business
  - The role of Information Technology in shaping modern business ideas
  - The role of education technology in form of modern business setup
  - The basic guidelines for getting information regarding setting up business
  - A framework for consumer decision making process
  - The overview of major factors influencing consumer behavior

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ENGLISH LANGUAGE & COMMUNICATION

TIUBFY-102

L-T-P: 1-1-0 **Credit: 2**

Unit: 1 Comprehending a text

Identifying important information & keywords using SQ3R (i.e. survey, question, read, recite, and review**)** or similar technique and linking words.

Comprehension – Responding to multiple choice& short-answer questions from the text; making sentences with marked words from the text to bring out the meaning of the words, filling up gaps to complete information structure, Identifying central idea of the text.

Unit: 2 Note taking

Communication using symbols & abbreviations.
Communication using diagrams & charts.
Using mind-mapping to establish relationship among information
Using SQ3R (or similar) technique, mind mapping, symbols, abbreviations, diagrams & charts to represent important information from written text in note form.

Unit: 3 Writing Technical Paragraphs

Developing notes into paragraph (that is, from given information in diagrams, pictures, charts & so on).
Concepts of Topic Sentence and Supporting sentences.
The paragraph types are:

1. Description of process and route
2. Problem-Solution type
3. Cause & Effect type
4. Comparing & contrasting type

Unit: 4 (Writing Technical Reports)

The reports should contain a front Covering Letter

1. Progress Reports
2. Industrial Accident Report
3. Feasibility Report

Recommended Books:

Main Reading:

1. Ghosh, Mukherjee and Ghosh, English Skills for Technical Students, Orient Black Swan

2. P.C. Wren and H. Martin, High School English Grammar and Composition, S. Chand & Co. Ltd.

3. Dr. Sunita Mishra and Dr. C. Muralikrishna, Communication skills for Engineers, Pearson

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Supplementary Reading:

1. Sanjay Kumar and Pushp Lata, Communications Skills, Oxford University Press

2. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles & Practice, Oxford University Press.

3. Duss and Duss, Higher Secondary, Comprehension Test Question Bunch.

MATHEMATICS-I
TIUBSM-103

L-T-P: 3-1-0 **Credit: 4**

Unit 1: ALGEBRA

Logarithm 1.1.1 Definition of natural and common Logarithm 1.1.2 Laws of Logarithm, Simple Problems.

Complex Numbers 1.2.1 Definition of Complex numbers, Cartesian and polar. Exponential forms of complex numbers. 1.2.2 Modulus, amplitude & conjugate of a complex number 1.2.3 Algebra of Complex numbers (Equality, Addition, Subtraction, Multiplication). 1.2.4 Cube roots of unity & its properties. 1.2.5 De Moivre's theorem (statement only) and simple problems.

Quadratic Equations 1.3.1 Definition of Quadratic Equations, 1.3.2 Analysing the nature of roots using discriminate, 1.3.3 Relation between roots & coefficients, 1.3.4 Conjugate roots.

Binomial Theorem 1.4.1 Definition of factorial notation, definition of permutation and combination with formula 1.4.2 Binomial theorem for positive index (statement only) 1.4.3 General term and middle term. 1.4.4 Binomial theorem for negative index (statement only).

Partial Fraction 1.5.1 Definition of polynomial fraction, proper & improper fractions and definition of partial fractions 1.5.2 Resolving proper fractions into partial fractions with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors.

Unit 2: Vector Algebra

Definition of a vector quantity.

Concept of Position vector and Ratio formula.

Rectangular resolution of a vector.

Algebra of vectors – equality, addition, subtraction & scalar multiplication.

Scalar (Dot) product of two vectors with properties.

Vector (cross) product of two vectors with properties.

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Applications 2.7.1 Application of dot product in work done by a force and projection of one vector upon another. 2.7.2 Application of cross product in finding vector area and moment of a force.

Unit 3: Trigonometry

Trigonometric Ratios of associated, compound, multiple and sub-multiple angles.

Inverse trigonometric functions: Definition, formulae and simple problems.

Properties of Triangle – sine, cosine and tangent formulae -Simple Problems.

Unit 4: Coordinate Geometry & Mensuration

Co-ordinate System 4.1.1 Cartesian & Polar co-ordinate system 4.1.2 Distance formula and section formula 4.1.3 Area of a triangle and condition for collinearity.

Straight Line 4.2.1 Equation of straight line in slope point form, intercept form, two-point form, two-intercept form, normal form. 4.2.2 General equation of a straight line. 4.2.3 Angle between two straight lines – Condition for parallelism and perpendicularity. 4.2.4 Length of perpendicular from a point on a line. Perpendicular distance between two parallel lines.

Circle 4.3.1 Equation of circle in standard form, centre-radius form, diameter form, two-intercept form.4.3.2 General equation of circle with a given centre and radius. Simple Problems.

Conic Section 4.4.1 Standard equations of parabola, ellipse & hyperbola. 4.4.2 Definition of focus, vertex, directrix, axes, eccentricity. Simple problems.

Mensuration 4.5.1 Regular Polygon of n sides – Formula for area and perimeter. 4.5.2 Prism and Pyramid – Formula for volume & Surface area. Simple Problems.

Unit 5: Function, Limit & Continuity

Function 5.1.1 Definitions of variables, constants, open & closed intervals. 5.1.2 Definition & types of functions, Simple Examples.

Limits 5.2.1 Concept & definition of Limit. 5.2.2 Standard limits of algebraic, trigonometric, exponential and logarithmic functions. 5.2.3 Evaluation of limits.

Continuity 5.3.1 Definition and simple problems of continuity.

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Unit 6: Derivative

Definition of Derivatives, notations.

Derivative of standard functions.

Rules for differentiation in case of sum, difference, product and quotient of functions.

Derivative of composite functions (Chain rule).

Derivatives of inverse trigonometric functions.

Derivatives of implicit functions.

Logarithmic derivatives.

Derivatives of parametric functions.

Derivative of one function with respect to another function

Second order derivatives.

Applications of Derivatives. 6.11.1 Geometric meaning of derivative. 6.11.2 Rate measurement

Maxima & Minima (one variable)

Recommended Books:

Main Reading:

1. B.K. Paul, Diploma Engineering Mathematics (Vol-1), U.N. Dhar & Sons.
2. A. Sarkar, Mathematics (First Semester), Naba Prakashani
3. G.P. Samanta, A Text Book of Diploma Engineering Mathematics (Vol-1), Learning Press
4. Dr. S. Bose and S. Saha, A Complete Text Book of Mathematics, Lakhsmi Prakasan

Supplementary Reading:

1. H.S. Hall and S.R. Knight, Higher Algebra Book Palace, New Delhi
2. S.L. Loney, Trigonometry, S. Chand & Co.
3. H.K. Dass, Engineering Mathematics, S. Chand & Co.
4. T.M. Apostol, Calculus (Vol - I), John Wiley & Sons.
5. B. K. Pal and K. Das, Engineering Mathematics (Vol - I), U.N. Dhar & Sons
6. B.C. Das and B.N. Mukherjee, Differential Calculus, U.N. Dhar & Sons

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PHYSICS-I

TIUBSP-104

L-T-P: 2-1-0 **Credit: 3**

Unit-1: UNITS, DIMENSIONS & MEASUREMENTS

System of units: Need of measurement in engineering and science. CGS, MKS and SI. Fundamental and derived units (SI).

Dimensions: Dimensions of physical quantity. Principle of dimensional homogeneity (explanation with examples). Applications of dimensional analysis. Limitations of dimensional analysis.

Estimation of errors: Concept of significant figure. Absolute error, Relative or Proportional error and percentage error (concept only). Accuracy & precession of instruments (concept only, examples only with slide calipers and screw gauge).

Unit-2: General Properties Of Matter

Elasticity: Deforming force and restoring force. Elastic and plastic body. Stress and strain. Hooke's law. Stress – strain diagram. Young's modulus, Bulk modulus, Rigidity modulus and Poisson's ratio (definition and formula) and relation between them (no derivation). (Simple numerical problems).

Surface tension: Cohesive and adhesive forces. Definition, dimension and SI unit of surface tension.

Surface energy (concept only). Angle of contact (definition only). Capillarity, shape of liquid meniscus in a capillary tube, rise of liquid in a capillary tube (no derivation, simple numerical problems). Effect of impurity and temperature on surface tension. Some natural examples of surface tension.

Fluid Mechanics: Pascal's law. Multiplication of force. Buoyancy. Conditions of equilibrium of floating body. Archimedes' principle. [Simple numerical problems]. Streamline flow and turbulent flow of a fluid (concept), critical velocity (definition only). Equation of continuity and Bernoulli's theorem (statement and equation only, simple problems). Viscosity, Newton's formula for viscous force, co-efficient of viscosity (definition, dimension and SI unit). Stokes law (dimensional derivation) and terminal velocity (concept and formula only).Effect of temperature on viscosity.

Unit-3: Heat And Thermodynamics

Thermal expansion of solid: Linear, areal and cubical expansion and their coefficients (definition and formula) and their relation (no derivation). Change of density with temperature (formula only). (Simple numerical problems).

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Transmission of heat: Conduction, convection and radiation (differences). Thermal conductivity (formula, definition, dimensions and SI unit). (Simple formula based numerical problems including composite slab). Examples & use of good and bad conductor of heat.

Thermodynamics: Zeroth law of thermodynamics. Temperature and internal energy (concept only). First law of thermodynamics (statement and equation only). Specific heats of gas, their relation (no derivation) and their ratio. Isothermal, isobaric, isochoric and adiabatic process (definition only).

Unit-4: Light

Photometry: Luminous flux, luminous intensity, illumination and their S.I. units — Principle of Photometry (statement only).

Refraction Of Light: Refraction of light through plane surface. Laws of refraction. Refractive index -- Relative & Absolute, its relation with the velocity of light in different media. Total internal reflection and critical angle. Optical fibre (Principle & applications – mention only).

Optical Lens: Lens and definition of related terms (Recapitulation). Cartesian sign convention. Lens maker's formula (no derivation). Relation between u, v, f (usual symbols) (no derivation). Principle of magnifying glass. Power of a lens and its unit. Equivalent focal length & power of two thin lenses in contact (formula only). (Simple numerical problems).

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Wave Theory Of Light & Interference: Huygens's wave theory, wave front – spherical, cylindrical and plane wave front (Idea only). Huygens's principle of propagation of wave front. Analytical expression for 1D plane light wave. Principle of superposition of waves. Coherent sources (Idea only). Interference of light waves, constructive and destructive interference. Young's double slit experiment – analytical treatment.

Unit-5: Modern Physics Photoelectric Effect: Photoemission, Work function. Photoelectric current, its variation with intensity and frequency of incident radiation. Stopping potential, Threshold frequency. Concept of photon. Einstein's photoelectric equation. Principle of solar photo-voltaic cell and its uses.

Recommended Books:

Main Reading

1. Resnik & Halliday, Physics – I & II, Wily Eastern Ltd.

2. NCERT, Physics. Part – I & II

3. Arthur Beiser, Applied Physics, Tata McGraw-Hill

4. V. Rajendram, Physics – I, Tata McGraw-Hill

Supplementary Reading

1. Avadhanulu, Kshirsagar, Engineering Physics, S. Chand Publication

2. H. C. Verma, Concept of Physics. Vol. - I & II, Bharati Bhavan Pub. & Distribution

3. C. L. Arora, B. Sc. Physics. Vol. - I & II, S. Chand & Co. Ltd.

4. R. K. Gaur & S. L. Gupta, Engineering Physics, Dhanpat Rai Pub.

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CHEMISTRY-I

TIUBSC-105

L-T-P: 2-1-0 **Credit: 3**

Unit 1: (Atomic Structure and Chemical Bonding)

Atomic Structure : Bohr model of atom [Radius and Energy of H – atom is excluded] , De Broglie modification, Quantum numbers, Orbits and Orbitals, Aufbau principal, Pauli's Exclusion principle, Hunds rule of maximum multiplicity, Electronic configuration of elements up to atomic number 36. Definition of Atomic number, Mass number, Isotopes, Isotones and Isobars with suitable examples. Concept of hybridization sp3, sp2, sp and shape of molecules (simple example H2O, NH3, BCl3, BeCl2).

Chemical Bonding: Electrovalent, Covalent and coordinate bonds, H-bond in HF, water and ice.

Classification of solids: crystalline and amorphous. Relationship between structure and properties of the following crystalline solids- (i) Ionic solid i.e. Sodium chloride (ii) Covalent solid i.e. diamond and graphite (iii) Molecular solids i.e. metallic bonds and related properties. Properties and uses of Carbon, Silicon and Germanium.

Unit: 2

Avogadro Concept, Acids, Bases & Salts Avogadro number, Mole concept, Simple numerical problems involving Weight and volume. Acids, Bases and Salts (Arrhenius and Lewis concept) Basicity of acids and Acidity of bases, Neutralization reaction, Hydrolysis of Salts,. Equivalent Weight of acids, bases, & salts of Strength of Solution - normality, molarity, molality, formality and percentage strength, standard solution primary and secondary standards, concept of pH, and pH scale, Indicators and choice of indicator, principles of acidimetry and alkalimetry (simple numerical problems) Buffer solution (excluding numerical problems) Solubility product principle (excluding numerical problems), common ion effect with relation to group analysis.

Unit: 3

Oxidation, Reduction, Electrochemistry Oxidation and Reduction by electronic concept, balancing chemical equations by Ion-electron method, Redox Titration, Electrolysis, Arrhenius theory, Faraday's Laws, Electrolysis of $CuSO_4$ solution using Pt-electrode and Cu- electrode, simple numerical problems on electrolysis, Application of electrolysis such as Electroplating, Electrorefinings and Electrotyping, Electrochemical Cells, Primary Cell, Dry Cell, Secondary Cell, Lead storage cell, Electrochemical series.

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Chemical Equilibrium, Reversible and irreversible reactions, Exothermic and Endothermic reactions, concept of chemical equilibrium, Lechatelier's principle, Industrial preparation of Ammonia by Haber's Process, Nitric acid by Ostwald's process and Sulphuric acid by Contact Process (Physico chemical principles only), catalyst and catalysis.

Unit: 4

Minerals, Ores, Gangue, Flux, Slag, General method of extraction of metals with reference to Iron, Metallurgy copper and Aluminum (detailed method of extraction is excluded) Definition of Alloy, purposes of making Alloy, Composition and uses of alloys (Brass, Bronze German Silver, Deuralumin, Nichrome, Bell metal, Gun metal, Monel metal, Alnico, Dutch metal, Babbit metal, stainless steel), Amalgams, properties and uses of cast iron, wrought iron, steel and sponge iron , Manufacture of steel by L-D process, composition and uses of different alloy steels.

Unit: 5

Water Soft and Hard water, Action of soap on water, Types of Hardness, causes of hardness, Units of hardness, Disadvantages of using hard water, Estimation of total hardness by EDTA method, Removal of hardness - Permulit process, Ion-exchange process, phosphate conditioning and calgon treatment. Distilled water and deionised water.

Unit: 6

Name of the Topics: Organic Chemistry Organic compounds, their differences from inorganic compounds, Classification Homologous series, Functional groups, Isomerism, Nomenclature up to C5, properties and preparation of Methane, Ethylene and Acetylene, Methylated spirit, Rectified spirit, Power alcohol, Proof spirit, uses of Benzene, Naphthalene and phenol, Chromatographic techniques of separation of organic compounds (Thin-Layer Chromatography).

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Recommended Books:

Main Reading:

1. S. S. Dara, Environmental Chemistry Pollution Control, S. Chand Publication
2. Dr. Aloka Debi, A Text Book of Environmental Engg., Dhanpat Rai Publishing Co.
3. Jain and Jain, Engineering Chemistry, Dhanpat Rai Publishing Co.
4. Madhusudan Chowdhury, Chemistry I & II, Naba Prakashani
5. Dr. Kaberi Bhattacharya, Chemistry I and II, Lakshmi Prakasani
6. Dr. Aloka Debi, Chemistry I and II, Bhagabati Prakasani

Supplementary Reading:

1. Jain and Jain, Engineering Chemistry, Dhanpat Rai Publishing Co.
2. Dr. Aloka Debi, A Text Book of Environmental Engg, Dhanpat Rai Publishing Co.
3. Shrieve Atkins, Industrial Chemistry
4. Bahl and Bahl, A Text Book of Organic Chemistry, S. Chand Publication
5. M. M. Uppal, Engg. Chemistry, S. N. Poddar and S. Ghosh
6. General & Inorganic. Chemistry Book Syndicate Pvt. Ltd.
7. Harish Kr. Chopra, Anupama Parkar, Engg. Chemistry A Text Book, Narosha Publishing House
8. B. K. Sharma, Industrial Chemistry, Goel Publishing House

ENGINEERING MECHANICS-I

TIUBPM-106

L-T-P: 3-1-0 **Credit: 4**

Unit 1 (Force Systems):

Fundamentals and Force system: Definitions of Mechanics, engineering mechanics, statics, dynamics, kinetics, kinematics, rigid body, scalar and vector, force, SI unit of force, representation of force by vector and by Bow's notation method, Characteristics of a force, effect of a force, Principle of transmissibility, Classification of force system (coplanar and non-coplanar), detail classification of coplanar force system (collinear, concurrent, non- concurrent, parallel, like parallel and unlike parallel).

Resolution of a force: Definition, Method of resolution, mutually perpendicular components and non – perpendicular components.

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Moment of a Force: Definition, measurement of moment of a force, SI unit of moment, physical significance of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments – Varignon's theorem and its use. Couple- Definition, SI unit, measurement of moment of a couple, Equivalent couples- resultant of any number of coplanar couples, resolution of a given force into a force acting at a given point and a couple, properties of couple.

Composition of Force: Definition of resultant force, method of composition of force – Analytical method - parallelogram law, triangles law & polygon law of force, Algebraic method for determination of resultant for concurrent, non-concurrent & parallel coplanar force system. Graphical method - space diagram, vector diagram and funicular polygon to determine resultant for concurrent & parallel force system only.

Unit 2 Equilibrium:

Definition, condition of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram.

Lami's Theorem – Statement & Explanation, Application of this theorem for solving various engineering problems.

Definition of equilibrant, relation between resultant and equilibrant, equilibrant of concurrent & non-concurrent force system.

Beams – Definition, types of beams (cantilever, simply supported, overhanging, fixed and continuous), types of end supports (simple support, hinged, roller, fixed), classification of load, reaction of a simply supported, cantilever and overhanging beam subjected to vertical point load and uniformly distributed load by analytical and graphical method.

Unit 3 (Friction):

Definition: friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction & angle of repose, cone of friction & its significance, types of friction, laws of friction, advantages & disadvantages of friction.

Equilibrium of bodies on horizontal and inclined plane: equilibrium of body on horizontal plane subjected to horizontal and inclined force, equilibrium of body on inclined plane subjected to forces parallel to inclined plane only, Ladder friction.

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Unit 4 (Centroid and Centre of gravity):

Centroid: Definition of Centroid, moment of an area about an axis, Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle, quadrant of a circle. Centroid of composite figure. (No deduction for determining Centroid of basic geometrical figures).

Centre of gravity: Definition of centre of gravity, centre of gravity of simple solids such as cylinder, sphere, hemisphere, cone, cube and rectangular block. Centre of gravity of composite solids. (No deduction for determining Centre of gravity of simple solids)

Unit 5 (Simple Machine):

Definition: simple machine, compound machine, load, effort, mechanical advantage, velocity ratio, input of a machine, output of a machine, efficiency of a machine, ideal machine, ideal load, ideal effort, machine friction, load lost in friction, effort lost in friction.

Analysis: Law of machine, maximum mechanical advantage of a machine & maximum efficiency of a machine, Reversibility of a machine, condition of Reversibility of a machine, self-locking machine.

Study of Simple machine: Calculation of mechanical advantage, velocity ratio, efficiency and identification of reversible or self-locking machine of following machines: Simple Axle & Wheel, Differential axle and Wheel, Weston's differential pulley block, Single Purchase crab, Double Purchase crab, Worm & Worm wheel, geared pulley block, Screw Jack, Pulleys (first, second & third system of pulleys).

Recommended Books:

Main Reading:

1. D.S.Kumar, Engineering Mechanics, S.K. Kataria & Sons

2. R.S.Khurmi, Engineering Mechanics, S. Chand & Co

3. Basu, Engineering Mechanics, Tata McGraw Hill

4. R.C. Hibbeler, Engineering Mechanics, Pearson Education

5. S. S. Bhavikatti, K. G. Rajashekarappa, Engineering Mechanics, New Age International

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Supplementary Reading:

1. R.K. Rajput, Engineering Mechanics, S.K. Kataria & Sons

2. Beer, Johnson, Engineering Mechanics, Tata McGraw Hill

3. S.Ramamruthum, Applied Mechanics, Dhanpat Rai & Sons

PHYSICS LABORATORY
TIUBSP-194

L-T-P: 0-0-3 **Credit: 2**

Suggested Experiments:

1. Young's Modulus
2. Determination of Acceleration due to Gravity
3. Experiment on Magnetism
4. Rigidity Modulus
5. Experiment on Light
6. Refractive Index
7. Find out the Density
8. Experiment on Heat

Recommended Book:

1. Griffith, W. Thomas, Physics of Everyday Phenomena, McGraw-Hill.

CHEMISTRY LABORATORY
TIUBSC-195

: 0-0-3 **Credit: 2**

Experiment 1: Acid-base titration involving molarity and normality

Experiment 2: Determination of solubility product

Experiment 3: Determination of kinetics of ester hydrolysis

Experiment 4: pH-metric or potentiometric titration

Experiment 5: Determination of partial molal volume of Ethanol/water mixture by spectrophotometry

Experiment 6: Measurement of the coefficient of viscosity

Experiment 7: Surface tension and Parachor

Experiment 8: Qualitative analysis- identification of the following in a given salt:

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Cations: NH^{4+}, Pb^{2+}, Cu^{2+}, Al^{3+}, Fe^{2+}, Fe^{3+}, Zn^{2+}, Ca^{2+}, Mg^{2+} etc.
Anions: CO_3^{2-}, NO_2^-, SO_3^{2-}, SO_4^{2-}, NO_3^- etc.

Experiment 9: Identification of the following compounds and functional groups based on observations

Aliphatic compounds: formaldehyde; ethanol; acetic acid; acetone; glucose etc.

Aromatic compounds: benzoic acid; phenol; aniline; benzaldehyde etc.

Experiment 10: Separation of mixtures of organic compounds utilizing the concept of boiling point/melting point/solubility

Recommended Books:

Main Reading:

1. Paradis and Jeffrey, Hands on Chemistry Laboratory Manual, McGraw-Hill publication.

Supplementary Reading:

1. Garland and Crawl, Experiments in Physical Chemistry, McGraw-Hill Publication.

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TECHNICAL DRAWING

TIUBPH-196

L-T-P: 0-0-3 **Credit: 2**

List of practical:

1. Lettering, Scale & Geo.Const

Single Stroke vertical Alphabets &Numerical Plain Scale and Diagonal Scale (reduced & enlarged) Construction of Regular Polygons.(1 Sheet).

Intellectual skills: To develop ability to understand Scaling and problem on geometrical constructions.

Motor skills: To develop ability to draw Scale & geometrical constructions

2. Engineering Curves & loci of points

Draw ellipse, parabola, hyperbola, involutes, cycloid, spiral Draw locus of point on any one mechanism. (1 Sheet)

Intellectual skills: To develop ability to differentiate between conic and curves. To develop ability to identify the type of locus from the nature of surface and the position of generating circle. Able to interpret the given mechanisms and locus of points. (1 Sheet)

Motor skills: To develop ability to draw different types of curves.

3. Projection of line and planes

Two problems on projection of lines and two problems of planes. (1 Sheet)

Intellectual skills: To develop ability to differentiate between true length and apparent length. To interpret the position of lines and planes with plane.

Motor skills: Able to draw orthographic projections of line and planes.

4. Orthographic projections
Four objects by first angle method (1 Sheet)

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Intellectual skills: Develop ability to interpret first angle projection method to interpret and able to solve problem on orthographic projection of given object.

Motor skills: Develop ability to draw orthographic projections by first angle projection method.

5. Isometric projection

Four objects two by true scale and another two by isometric scale (1 Sheet).

Intellectual skills: Develop ability to differentiate between isometric view and isometric projections. To differentiate between isometric scale and true scale.

Motor skills: Develop ability to draw isometric views and isometric projections from given orthographic views of an object.

6. Introduction to CAD

Draw a figure with the help of different draw and modify Command by Computer and redraw any one object of Orthographic projection.

Intellectual skills: To develop ability to handle different tools of CAD.

Motor skills: To develop ability to draw different figure by computer.

Recommended Books:

Main Reading:

1. N.D. Bhatt., Engineering Drawing, Charotkar Publishing House

2. R.K.Dhawan, Engineering Drawing, S.Chand & Co.

Supplementary Reading:

1. K.Venugopal, Engineering Drawing and Graphics - AutoCAD, New Age publication

2. B. Agrawal and C M Agrawal, Engg. Drawing, Tata McGraw Hill Education Pvt. Ltd.